PROPOSED MOUNT SINAI

MULTIPURPOSE

BUILDING PROJECT

PHASE 1A ARCHAEOLOGICAL STUDY

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PROPOSED MOUNT SINAI MULTIPURPOSE BUILDING PROJECT

NEW YORK, NEW YORK

PHASE 1A REPORT

PHASE 1A ARCHAEOLOGICAL STUDY

PREPARED

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EXECUTIVE SUMMARY

The Mount Sinai School of Medicine proposes to erect an 18-story multipurpose building on the western two-thirds of Lot 23, Block 1604, located on the east side of Madison Avenue between 98th and 99th Streets. In connection with Mount Sinai's application to the Dormitory Authority of the State of New York for project funding, an Environmental Impact Statement is being prepared, which includes the following Phase 1A Archaeological Study.

In order to satisfy the requirements of the New York State Office of Parks, Recreation and Historic Preservation for the assessment of archaeological potential, Historical Perspectives, Inc. has conducted a documentary study which addresses two separate issues. First, the project site's potential for having hosted significant prehistoric and/or historical archaeological resources, and second, the likelihood that such resources would have survived post-depositional disturbances.

Documentary research has identified three separate sources of potential archaeological remains. The past environmental components of the project site and its vicinity suggest a strong probability of exploitation by prehistoric Americans. There is also evidence that a prehistoric Indian village, Konaande Kongh, was located in the vicinity of the study parcel. (See Fig. 3) In addition to this prehistoric potential, an examination of historical maps and photographs indicates two historical occupations which may have left archaeological remains on the project site: an unidentified structure dating from the first decade of the 19th century (See Fig. 10); the probable presence of squatters' shacks, dating from the second half of the 19th to the first decade of the 20th century (See Fig. 12).

However, due to subsurface disturbance from an extensive site regrading as well as the construction of tenement buildings with basements on the project site, these areas of potential sensitivity would have been obliterated. Based on our extensive survey and study of available information on the proposed site of the Mount Sinai Medical School Multipurpose Building, it is concluded that the project site is not sensitive for cultural material from the prehistoric or historical periods, and therefore, there is no potential for adverse impact.

I. INTRODUCTION

The Mount Sinai School of Medicine proposes to develop an approximately 18-story (plus cellar and subcellar levels), 675,000-gross-square-foot multipurpose building on the western portion of the block bounded by Madison and Park Avenues and 98th and 99th Streets. The proposed project will replace a 225-space surface parking lot on a 54,944-square-foot site. A parking garage, also belonging to Mount Sinai, occupies the eastern end of the block.

Above grade, the proposed building will contain research labs, clinical labs, 50 psychiatric care beds, administrative offices, an auditorium, a seminar room, a cafeteria for staff and faculty members and mechanical space. Below grade, it will include a vivarium and research laboratory, approximately 300 accessory parking spaces, and additional mechanical and office space. Mount Sinai is also contemplating connecting the proposed project to the rest of the Mount Sinai Campus by a tunnel running beneath Madison Avenue from the southeast corner of Madison and 99th Street to the west side of Madison Avenue. (See Fig. 1)

The existing 225-space surface parking lot occupies the western two-thirds of Lot 23 on Block 1604. The rectangular plot has a 200-foot frontage along Madison Avenue to the west, runs 264 feet along both East 98th and East 99th Streets, and to the east shares a 200-foot border with the seven-story parking garage which occupies the remainder of the block. The parking lot is surrounded by a chain-link fence, and has two small guard kiosks standing on it, one near the corner of Madison and 99th, and the other midway between 98th and 99th Streets, approximately 25 feet from Madison Avenue. (See Fig. 2)

To construct the project, the following approvals are required:

- Certification of Need approval from the New York State Department of Health;
- Special Order Calendar approval from the New York City Board of Standards and Appeals;
- Funding approval from the Dormitory Authority of the State of New York.

The Environmental Impact Statement for which this Phase 1A Archaeological Study has been prepared, was undertaken in connection with Mount Sinai's application to the Dormitory Authority for project funding. Conducted by Historical Perspectives, Inc. the following study addresses the concerns of the New York State Office of Parks, Recreation and Historic

Preservation (hereafter OPRHP) regarding the possible presence of subsurface archaeological resources and the potential for adverse impact on those resources by the proposed action. One of the matters reviewed is the Native American village called Konaande Kongh, that is believed to have been in the vicinity of the study site, as well as archaeological resources from historical occupations during the 19th century.

II. METHODOLOGY

In order to satisfy fully the requirements of the OPRHP for the assessment of archaeological potential, Historical Perspectives, Inc. has completed six separate processes. Each of these, described in more detail below, was necessary to address the two guiding issues:

1. What is the potential for the Mount Sinai Proposed Multipurpose Building Site to have hosted significant prehistoric and\or historical resources?

2. What is the likelihood that such resources have survived the subsurface disturbances concomitant with urbanization?

A. Primary Source Material

Of crucial importance in assessing the potential for site exploitation by prehistoric humans is the reconstruction of the site's pre-development topographic conditions (i.e., elevation and drainage) during various prehistoric cultural periods. Such information was sought during each of the task phases. 17th-, 18th- and 19th century topographical maps were collected and studied in the New York Public Library and the collection of the Manhattan Borough President's Office. Other sources of early maps include an historical and archaeological assessment report on the adjacent area of Central Park prepared for and provided by the Central Parks Conservancy (Hunter 1990). I. N. P. Stoke's massive compilation of primary sources, The Iconography of Manhattan Island, provided important information concerning land title and use, as well as dates of street openings and closings. 19th- and 20th-century land use atlases were also researched in the New York Public Library, and provided information concerning the installation of municipal utilities and building type and construction.

B. Secondary Source Material

In order to place the Mount Sinai Proposed Multipurpose Building Site in an historical context, local and regional histories were reviewed for pertinent material (e.g., Riker's Revised History of Harlem and Hall's McGown's Pass and Vicinity). Works concerning Native American exploitation of the resources of Coastal New York written by Reginald P. Bolton, Arthur C. Parker, Robert S. Grumet and William A. Ritchie were researched as well.

C. Archaeological Literature

In addition to the sources described in the previous paragraph, inquiries were made to the New York City Landmarks Commission to determine whether any other Phase 1A studies have

been conducted in the Upper East Side/East Harlem area. Three reports were reviewed (See Hunter 1990; Rubinson and Winter 1989 and 1991).

Two prehistoric sites in the general vicinity of the project area, inventoried and identified by the New York State Museum, were based on information provided in Arthur C. Parker's The Archaeological History of New York (1920) (Hunter 1990). Their locations were taken into consideration in the discussion of prehistoric sensitivity.

D. Subsurface Disturbance Record

Paralleling the research conducted to determine the prehistoric and historical archaeological potential of the Mount Sinai Proposed Multipurpose Building Site, was an investigation of sources to determine the likelihood that any such resources were extant, surviving the normal destructive forces of development. Documentation of past construction (e.g., tenements, utility installation, roadways), grading and demolition was collected, to determine the cycles of late 19th- and 20th-century subsurface disturbances and to identify the possible impact of these cycles upon the pre-existing subsurface archaeological resources. Atlases, insurance maps and comparative data, as well as survey maps from the Facility Design and Construction Office at Mount Sinai were used to supplement the records of the Building Department (block and lot folders). This analysis was aided by data provided by Allee King Rosen and Fleming Inc, and the Mount Sinai Medical Center, which included soil boring logs and profiles (including Woodward-Clyde 1992). (See Appendix)

E. Informant Interviews

To augment the records research described above, interviews were conducted with professional archaeologists and historians knowledgeable in Manhattan prehistory and history. The Mount Sinai Medical Center Archivist, Barbara Niss, was also consulted concerning historical conditions on the project site.

F. Site Reconnaissance

A site visit and photographic record of current conditions was made in January 1993. (See Photographs 1-6)

III. ENVIRONMENTAL SETTING

Before the coming of Europeans, the topography of Manhattan was in distinct contrast to the gradually-sloping, homogenous landscape of concrete, brick and asphalt that presents itself to the modern observer. The retreat of the last glaciation of the Pleistocene, and the warming trend during the Holocene left Manhattan a terrain of rough and irregular hills, ridges and dales, with small streams and marshy wetlands. Underlain by schist, a hard metamorphic rock formed approximately 450 million years ago, the northern part of Manhattan Island had a very rugged appearance, with numerous schist outcrops and bluffs. (See Fig. 9) Over this was deposited a layer of glacial till, composed mainly of gravel, sand and loam interspersed with pebbles and boulders. The thickness of this layer could vary from a few inches to more than thirty feet in some of the narrow valleys (Hunter 1990:2-2,11)

This sort of terrain is depicted on the existing 18th- and 19th-century maps of the project area, drawn before the rhythmic repetitions of the city grid system's streets were imposed upon the wild landscape. Unfortunately, since these maps do not provide numerical measurements of elevations, the early terrain can only be described in the most general of terms. The project area embraces a wide range of topographic conditions. To the east and west are large hills or bluffs. The 1874 Viele map (Fig. 9) shows a rock outcrop near the southwestern corner of the study parcel. These hills slope down to a small unnamed creek running through the project site from south to north. The northward course of the creek suggests that the Mount Sinai Proposed Building Site slopes down as one proceeds north. Along the banks of the creek, some of the maps show a narrow ribbon of marshy ground, which along with the well-drained, elevated land on the slopes of the surrounding hills is included in the project site. Following the course of the creek to the north for approximately 900 feet, one comes to the edge of a large tidal marsh formed around the estuary of Harlem Creek and its tributaries. (See Figs. 6 and 9)

With the regulation of the surrounding streets during the late 19th century, tenement construction during the first decades of the 20th, and that of the present parking lot during the late 1960s, the low-lying land was filled in, graded and covered with blacktop. However, despite these construction and filling episodes, the project site still slopes down strongly toward the north, which is quite evident to the modern observer. Its elevation drops from approximately 56 feet along East 98th Street to about 46 feet along East 99th. (See Fig. 2, and Appendix)

IV. PREHISTORIC PERIOD

The prehistoric era in the New York City area can be divided into three time periods, based on prehistoric man's adaptations to changing environmental conditions. These are generally known as the Paleo-Indian (c.13,000 to 10,000 years ago), the Archaic (c.10,000 to 2,700 years ago) and the Woodland (c.2,700 to 300 years ago). In order to be able to assess the project site's potential for prehistoric exploitation, it is necessary to review these time periods, describing changes in climate and environment, along with the different human settlement patterns and adaptations associated with them. Only in this way can the attractiveness of the resources offered to prehistoric man by the Mount Sinai Proposed Multipurpose Building Site be evaluated.

Paleo-Indian Period (c.13,000 y.a. - 10,000 y.a.)

The Paleo-Indian encompasses the time of the final disappearance of Pleistocene glacial conditions from eastern North America, and the establishment of Holocene environments which were closer to modern conditions. Glacial recession from Manhattan was probably complete by about 18,000 years ago. At that time, a post-glacial conifer cover consisting mainly of spruce and pine was beginning to be augmented with hardwoods such as oak and hickory-trees, which, because of their food value, have a far greater utility for man than conifers. "A global warming trend about 12,000 B.C. encouraged Paleo-Indian settlement of the Northeast. By 8,000 B.C., when Paleo-Indians may well have been present in coastal New York, deciduous species dominated forests all along the eastern seaboard; the Pleistocene megafauna were rapidly becoming extinct, perhaps with the help of aboriginal hunters, and were being replaced by the temperate-climate fauna that are indigenous today" (Gwynne 1982:190-191).

The tool kits of the Paleo-Indian groups were oriented toward the procurement and processing of hunted animal resources. A preference for high-quality lithic materials has been noted and careful resharpening and maintenance of tools was common. The characteristic artifact of the Paleo-Indian Period is the fluted point. "A lifestyle of movement among the game-attractive environments has been hypothesized with the social organizations being based upon single and multiple family bands" (Grettler et al. 1988:7). These small highly mobile groups would not have left very much evidence of their activities. Sites dating from this time would consist chiefly of small campsites, lithic reduction stations, and isolated finds. This assumption is well-illustrated by the number and types of known Paleo-Indians artifacts and sites in the Northeast - a scattering of fluted points, and several small campsites, including the Port Mobil site on Staten Island (Ritchie 1980:3). No settlements have been identified in the vicinity of the project site, or on Manhattan Island. Adding to the difficulties of trying to locate potential Paleo-Indian sites is

the rise in the sea level since 10,000 years ago (roughly 75 to 80 feet), and to a much lesser degree, crustal subsidence since that time.

Archaic Period (c.10,000 to 2,700 years ago)

The Archaic Period is characterized by a series of adaptations in and to the newly-emerged full Holocene environments. By about 5,000 B.C. the modern distributions of both flora and fauna had been achieved. Environmental changes immediately before and after this stabilization are reflected in the Native American culture of the time, referred to as the Archaic. "With the warmer and drier climate, the tundra and the spruce forests disappeared and deciduous woodlands gradually replaced them. The oak and hickory woodlands of the project area and the rest of coastal New York attracted mast-eaters like the white-tailed deer and wild turkey. During this later post-glacial period, the melting ice no longer poured large amounts of meltwater into local rivers and streams. The slower stream flow allowed the growth of marsh areas and mudflats such as those once found approximately 900 feet to the north and east of the study site (See Fig. 3), which encouraged an influx of migratory waterfowl and the growth of numerous edible plant species and shellfish. The subsistence and settlement systems of Archaic groups were based on a restricted wandering system which consisted of seasonal movements to and from base camps located near [these] resources" (Kearns, Kirkorian and Lavin 1987:7).

Tool kits were more generalized than earlier Paleo-Indian kits and show a wider array of plant processing tools, such as grinding stones, mortars and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band-level organization whose numbers waxed and waned in relation to the availability of resources is evident. The archaeological record does present a profile of Archaic culture: small multi-component sites usually situated on tidal inlets, coves and bays, particularly at the heads of the latter, and at fresh water ponds on islands along the New York coastline, including Manhattan; and, by the Late Archaic stage, coastal sites and the exploitation of shellfish resources are heavily represented (Ritchie 1980:143; Kearns and Kirkorian 1986b:9). The Late Archaic Wading River complex, four archaeological sites on the north shore of Suffolk County, was found on the edge of a salt marsh, on the dry ground that ranges from only 2 to 7 feet above mean high water (Wyatt 1982:71). Areas of steep slope and poorly drained ground would not have been suitable for habitation or activity areas, although stray finds, like projectile points lost during resource exploitation, may occur in these locations.

The Paleo-Indian, Early Archaic and Middle Archaic cultural

periods are poorly represented in coastal areas of the Northeast, but by Late Archaic times sea level was so close to present levels that its subsequent small rise has failed to obliterate much of what remains in Coastal New York from that period (Gwynne 1982:192). In recent years, New York archaeologists have demonstrated an interest in considering the realistic potential for investigating these long-submerged sites (Personal communication, Bert Salwen, 3-11-88).

Woodland Period (c.2,700 to 300 years ago)

The Woodland Period can be correlated with a dramatic change in local climates and environments. A pronounced warm and dry period set in and lasted from c.5,000 to 3,000 years ago. Mesic forests were replaced by xeric forests of oak and hickory, and grasslands again became common. Some interior streams dried up, but the overall effect of the environmental changes was an alteration of the environment rather than a degradation. A continued rise in sea level also made many areas bordering the East River and Long Island Sound into sites of brackish water marshes such as those formerly in the vicinity of the project area. These marshes were extremely rich in exploitable resources. The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlement included the major river floodplains and estuarine swamp\marsh areas.

From approximately 3,000 years ago until the arrival of the first Europeans, Native Americans of southern New York shared common attributes of the Woodland Stage: the advent of horticulture, large permanent or semi-permanent villages, pipe smoking, the bow and arrow, extensive trade networks and the production of clay vessels. The habitation sites of the Woodland Indians increased in size and permanence as these people became ever more efficient in extracting food from their environment. The archaeological evidence from Woodland Period sites indicates a strong preference for large-scale habitation sites to be in close proximity to a major fresh water source, e.g., a river, a lake or an extensive wetland; and smaller scale sites for extractive operations, e.g., butchering stations, shell gathering loci and quarrying sites, to be situated at other resource locales. Late Woodland Stage sites of the East River Tradition in Manhattan and other parts of southern New York have been noted on the "second rise of ground above high water level on tidal inlets," and situated on "tidal streams or coves" and "well-drained sites" (Ritchie 1980:269). Carlyle S. Smith, who studied and analyzed the distribution of prehistoric ceramics in coastal New York, stated that "village sites" are found on the margins of bays and tidal streams" (Smith 1950:130).

Woodland Period tool kits show some minor variations as well

as some major additions from previous Archaic tool kits. Plant processing tools became increasingly common and their presence seems to indicate an intensive harvesting of wild plant foods that may have approached the efficiency of horticulture, which itself appeared during the second half of the Woodland Period. According to current archaeological research in the Connecticut River Valley (including carbon-14 dates), maize cultivation may have been in place as early as 800 years ago (Personal communication, Kevin McBride, PAST, University of Connecticut; Nicholas Bellantoni, Connecticut State Archaeologist; Linda McWeeney, Yale University, 4-13-88). The advent of horticulture is tied in with the introduction of ceramic containers which allowed for more efficient cooking of certain types of food and may also have functioned as storage for surplus food resources. "With the onset of relative sedentary lifestyles and intensified food production, which might have produced occasional surpluses, incipient ranked societies may have begun to develop, as indicated by the presence of extensive trade and exchange and some caching of special artifact forms" (Grettler 1988:10).

Anthropologists and linguists agree that when Europeans arrived in the New York City area, the Native Americans present were Munsee-speaking Upper Delaware Indians. The inhabitants of northern Manhattan were further identified by the early Dutch colonists as members of the Wiechquaesgeck group, branches of which also occupied the present counties of the Bronx and Westchester. A Dutch map from 1610 refers to the Manhattan-dwellers as *Manahata*, a Munsee word from which the name of the Island is derived (Grumet 1981:24,60). Historical narratives of Indian life written by European travelers and settlers provide us with our only first-hand descriptions of Native American daily life and customs during 17th century. Johannes de Laet, in his New World, or Description of West India, published in Holland in 1625, wrote that the Native Americans:

> . . . are divided into many nations and languages, but differ little in manners. They dress in the skins of animals. Their food is maize, crushed fine and baked in cakes, with fish, birds and wild game. Their weapons are bows and arrows, their boats are made from the trunks of trees hollowed out by fire.
>
> Some lead a wandering life, others live in bark houses, their furniture mainly mats and wooden dishes, stone hatchets, and stone pipes for smoking tobacco (Bolton 1972:16).

Isaak de Rasieres reported c.1628, that the island was "inhabited by the old Manhatesen; they are about 200 to 300 strong, women and men, under different chiefs." These "Manhatesen" may well have resided in the vicinity of the project site. However, since the

Manhattan branch of the Wiechquaesgeck had few furs to trade with the Dutch, there was little motivation on either side for good relations, resulting in several wars during the 1640s. These hostilities, coupled with the introduction of European diseases against which Native American populations had no natural protection, decimated Indian populations in the New York City area. This caused many groups to merge in order to maintain viable communities. The last of the Manhattans apparently left the island sometime after Rasieres account, joining the other Wiechquaesgeck on the mainland, where they were noted in 1680 as the **former** inhabitants of Manhattan Island (Grumet 1981:24,25).

To the casual observer, little evidence remains today of the original appearance of the project site and its surrounding area at the time of European colonization. According to the existing topographic maps, the project site lay in a narrow valley between low hills, with a creek running through the center. Nine-hundred feet to the north the creek drained into a large marsh which continued as far as the East River. This marsh was the estuary of the Harlem River and several other rivulets which drained the present Upper East Side. Tidal estuaries and the marshes which they form, provided man with an environment of extraordinary natural richness. Available resources included shellfish, of which there were some edible genera in all seasons; reeds and shrubs, such as the edible beach plum, and utility plants like cord grass and salt hay; water fowl, fish and small mammals. As outlined in the preceding pages, Woodland Indians preferred well-drained, elevated sites near a large-scale marsh biome. Although a stream's course necessarily runs through a topographically depressed area, the rising slopes of the hills on either side provided dry sites for temporary camps, food and lithic processing areas. The stream would have provided a ready source of fresh water, and perhaps following its course provided easy access to the nearby swamp.

Archaeologists rely not only on past environmental components to assess site potential, but also on tales of "Indian relics," ethnographic accounts, and published archaeological reports. However, attempts to reconstruct the Native American presence in the Carnegie Hill-East Harlem area through a compilation of these sources, have been hampered by disagreement among the various sources, as has been noted in other reports. Unfortunately, no archaeological fieldwork has been carried out to determine which of the contenders is correct (Rubinson 1991:4). The main disagreement centers on the placement of an Indian village, *Konaande Kongh*, which may mean, "hill where they fish with nets" (Grumet 1981:20). Reginald Bolton, who researched the Indian past of New York City during the end of the 19th and first half of the 20th centuries, in 1922 identified the village site as lying between present Madison and Lexington Avenues, from 98th to 100th Streets. This is less than a block from the project parcel. Isaac Newton Phelps Stokes earlier, yet exhaustive study of Manhattan documents and iconography places the site further north and west, within the

bounds of present-day Central Park, approximately where 105th Street and Sixth Avenue would intersect. To further confuse matters, in 1934 Bolton wrote that Konaande Kongh, the home of Rechewac, "a chief who resided in the vicinity known as Rechewanis, indicating a 'little sandy stream,'" was in the vicinity of 94th Street and Park Avenue. According to Bolton, Konaande Kongh was a seasonal settlement, because the Manhattan Wiechquaesgeck resided in the Bronx during the summer (Bolton 1935:27,54,134). Robert Grumet's later, parallel line of research into Native American place names reports only Bolton's 1922 siting between 98th and 100th Streets.

Arthur C. Parker's 1920 work The Archaeological History of New York, in conjunction with his unpublished maps, is used by state offices in Albany as a major resource in establishing potential archaeological sensitivity. Parker identified no Native American sites at any of the suggested locations of Konaande Kongh. This is not to say that the village was not in one of the abovementioned locations, but that no archaeological traces of it have been recovered to support any of the candidates. The nearest village site identified is at approximately East 110th Street and the East River, and no archaeological sites are identified within the vicinity of the project area (Parker 1920:627).

According to Alanson Skinner's research during the early part of this century, the only Indian remains left on Manhattan Island at that time were located at the northwestern end of the island. However, this may be a function of the more concentrated development during the historical period at the southern end of the island, as well as the later occupation by Native Americans at the northern end, resulting in higher site visibility (Kearns and Kirkorian 1989:4).

On the other hand there appears to be substantial agreement upon the identification of the toponym *Rechewanis* (*Rechgawanis, Rechwanis*), with the marshes to the northeast of the project area (Stokes 1916 II:193; Bolton 1922:map). All sources also identify the course of the generally north-south running Kingsbridge Road as the route of an important Native American path. A section of this "Manhattan Path" ran through present Central Park, approximately 1,800 feet west of the project site, in order to bypass the Rechewanis swamp. Bolton also plots the course of a branch path connecting Konaande Kongh to the man Indian route, which passes through the south corner of the project site. (See Fig. 3)

Based only upon topographical factors, the site of the Mount Sinai-proposed project presents a high probability of having been exploited by man during the prehistoric period. In addition, there is strong evidence of a Native American presence in the general vicinity, as evidenced by a series of Indian place names, and the placement of an Indian village in the vicinity of the parcel, with the strongest candidate as close as 250 feet to the east. However,

subsequent building and grading episodes may have obliterated the site. These potentialities along with the available evidence showing the extent of subsurface disturbance will be discussed in the Conclusions and Recommendations section of this report.

V. HISTORICAL PERIOD

The permanent settlement of Manhattan Island by Europeans under the auspices of the Dutch West India Company began in 1625, with a small group of colonists establishing themselves at the southern tip of the Island. The village was optimistically named New Amsterdam, after the great commercial city of Holland.

As can be seen from the Manatus Map of 1639 (Fig. 4), arable land was parceled out for farms or *bouweries*. The closest farm to the project area is #19, which is situated in the vicinity of East 107th Street, west of Fifth Avenue. Hendrick de Forest acquired this grant of 100 morgen (about 210 acres) from the Dutch Governor-General in 1636, but died in 1637 before his house was finished. The farm was purchased at auction by Jean de la Montagne in 1638 (Stokes 1916 II:194). Montagne, a Huguenot physician, was a member of Governor-General Willem Kieft's council and commanded various military expeditions within New Netherland during the 1640s (Brodhead 1856:275,322,386). Montagne completed Forest's house and later managed to get Kieft to grant him an additional patent to the area known as Rechawanis in 1647 (See Fig. 3), which he claimed had been occupied by Forest as well (Stokes 1916 II:194-195). The bouwerie, called *Vredendal,* meaning peaceful valley in Dutch, stretched from 94th to 108th Streets, and from the East River as far west as Eighth Avenue. During Montagne's ownership, c.1665, a grist mill was built on the south shore of Benson's or Harlem Creek, about 1,600 feet northeast of the study parcel (Caldwell 1882:12). (See Fig. 6)

Montagne sold his property in 1672 for 3,000 guilders to John L. Bogert, from whom it was purchased by Johannes Benson in 1706 (Ibid.). The Bensons were important landowners in Harlem during this period, and Harlem Creek was named Benson's Creek for many years. By the early 19th century however, the original Montagne farm had been split up among various members of the Benson family. Apparently the project site left the family during the 18th century, but according to the "Map of the Margaret McGown and Adjoining Estates . . ." (See Fig. 10), the western section ("J") was repurchased by Margaret Benson McGown in 1821, and the rest ("I") in 1837, and passed on to her son, Sampson Benson McGown. It was Margaret, who after her husband's passing purchased and ran with Sampson the tavern near the pass to Harlem Plain (three-quarters of a mile northwest of the study lots), which was later called McGown's Pass. Through this pass went the Kingsbridge or Boston Post Road. McGown's Pass Tavern was a favorite watering hole for gentlemen coming from the City with "their foxhounds to hunt" (Hall 1905:15; Hunter 1990:4-2). (See Fig. 5)

The glacial till which was the chief component of the soil in the project area, was a poor agricultural medium. This is evidenced by the paucity of farms in this section of Manhattan, as revealed by Colonial Maps (See Figs. 4 and 6). The project area

was basically a region through which to pass on the way to New York City, approximately six miles to the south, or to Harlem village and other points north. The area achieved some importance during the American Revolution as well as the War of 1812, when the bluffs north of the project area, and McGown's Pass in particular, were fortified, since they controlled access to New York City. Apparently the Indian branch path which was identified by Bolton was also transformed into a Colonial road, as it appears on the British Headquarters Map of 1782. For both Native Americans and Europeans this meandering route was the simplest path between the hills and across the swamp to Harlem Creek (See Figs. 3, 5 and 6). In 1798 a project was proposed to make this crooked way straight, thereby moving the roadbed to the west out of the project area. Work was ordered to begin in September of 1799 (Spielman and Brush 1881:n.p.). A comparison of the British Headquarters Map and the Commissioners' Map details this change. In the first the road runs to the east of the project site creek, while in the improved road, it is the creek that lies to the east of the road. (See Figs. 6 and 7) A new bridge built across Harlem Creek made this route popular, and the contemporary maps refer to it as the "Road to Harlem Bridge" and the "Eastern Post Road." (See Fig. 10) The highway's new importance is indicated by the latter title, which was previously reserved for sections of the Kingsbridge Road about 1,800 feet to the west (Stokes VI 1928:593). At the same time the improved post road appeared on maps, one and sometimes two structures were also depicted, immediately adjacent to the project site on its west. (See Figs. 7, 10 and 11) These structures appear on maps which have a minimum date range of between 1811 and 1820 (Randall II:50), but do not appear in the 1782 British Headquarters Map. Given the isolation of the area as well as the buildings orientation to the road, it is most likely that this structure was a tavern or inn, built after the road's construction. Such establishments had been operating on the neighboring Kingsbridge Road since the 1680s (Hunter 1990:4-2). Perhaps the second building not always depicted was a stable or other out-building. Although neither building stood completely on the project site, their positions facing the road would have made the study parcel their backyard, a prime location for privies, wells or the surface scatter of refuse.

With New York City's adoption of the grid system street plan in 1807, the days of the Native American- and Colonial-derived roads were numbered, as the avenues with their perpendicular side streets were regulated and opened further and further north with accompanying urbanization. The grid system, which was laid down despite existing hills, valleys and streams, more or less remade the face of Manhattan Island. The study area, so far north, did not really feel the effects of the new street plan until after 1850. Madison Avenue, not in the original plans, was added midway between Fifth and Fourth (Park) Avenues, and not declared a public street between 86th and 120th Streets until 1867 (Stokes 1926 V:1927).

In the 1850s and 60s, "Manhattan north of Forty-second Street was not pleasant countryside; it was garbage dumps, shanty towns, and decrepit taverns, all punctuated by outcroppings of rock." One census counted over 10,000 squatters in this area (Lockwood 1976:236), while the *New York Times* conservatively estimated the Manhattan squatters' population at 20,000 in 1864 (Plunz 1990:53-54). An 1865 report from the Council of Hygiene describes the shanty-dweller's living conditions:

> The shanty is the cheapest and simplest domicile constructed in civilized communities. The typical shanty is built of rough boards, which form the floor, the sides, and the roof. It is built either on the ground, or but little raised above it. It is from six to ten feet high, and its ground area varies much in different cases; but it is always of moderate extent. It contains no fireplace or chimney, but a stovepipe, the pipe from which passes through a hole in the roof. It has from one to three or four windows, with single sash, each containing from four to six panes of small size. Some shanties have but one room; others an additional small apartment, used as a bedroom. The better shanties are lathed and plastered. It is evident that, to the occupants of the shanty, domiciliary and personal cleanliness is almost impossible. In one small room are found the family, chairs, usually dirty and broken, cooking utensils, stove, often a bed, a dog or cat, and sometimes more or less poultry. On the outside, by the door, in many cases are pigs and goats, and additional poultry. There is no sink or drainage, and the slops are thrown upon the ground. The water used is sometimes Croton, which is brought to the shanties in pails, usually from one of the avenues. In other places, where the Croton hydrants are too far away, and the ground is marshy, the water is obtained from holes dug a little below the surface. This water often has a roiled appearance, and unpleasant flavor. Shanties are usually built promiscuously over the ground, without the least regard to order (Plunz 1990:54-55).

Even as early as the 1820s the northerly sections of Central Park were home to many small houses and shanties, particularly in the area south of 104th Street (Hunter 1990:5-12). Although squatting in Central Park became more widespread after 1853, when the City began acquiring private land for the Park, one of Frederick Law Olmsted's first acts as Park Commissioner in 1857 was to remove 300 shacks from the Park. The construction of Central Park had an important effect on the East Side of Manhattan. The Park made Fifth Avenue, which formed its eastern border, New York's new fashionable neighborhood. As a result, real estate prices and development increased there and on adjacent streets. Another factor was the completion of the Third Avenue Elevated Railroad on

Third Avenue in 1881, which made the Upper East Side more accessible. Squatters, who may have paid "rent" to land speculators, were evicted from the properties as the residential building boom moved north, and one- and two-family houses and tenements[1] were erected. (Plunz 1990:54; Landmarks 1974:2).

Photographs of the project area from 1893 show large numbers of squatters shacks in the vicinity of the study site. They conform to the Council of Hygiene's description to a remarkable degree. Paned windows, peaked roofs and porches are visible (See Figs. 12, 13 and 14), and one photograph even shows a single tenement in the distance (See Fig. 13). Although the photographs do not show shanties actually on the project site, the numbers of structures all around it, and the fact that the project lots were the last open ground in the general vicinity to be developed, almost certainly confirms the presence of squatters on the study parcel. Their privies, water holes and surface scatter, if they survived subsequent disturbance, would have created an artifactual time capsule of squatters lifeways at the end of the 19th century.

Because the first tenements on the project site only appeared between 1897 and 1902, when 5-story buildings appear along East 98th Street on Lots 29, 30 and 31 in the southeast corner of the site (See Fig. 15), street paving and municipal services such as water and sewer lines were already in place for the residents of adjacent blocks. Madison Avenue had been paved between 1883 and 1889, while the side streets were paved by 1897 (Bromley 1897:32; Beers 1883 IV:N; Robinson 1889 VI:20). By 1905, nine apartment buildings, with from five to seven stories had been erected on the project lots, and by 1911 the five additional six-story structures filled in the remaining empty spaces. (See Figs. 15 and 16) The four buildings along the Avenue appear to be the more prestigious addresses, and they received Anglo-French names, indicative of their residents' European sophistication. Beginning at the corner of East 98th Street, they were called the Ormiston, the Lucinda, the Lorraine and the Blythbourne. Despite the fact that all the buildings on the block had five or more stories, the Lucinda and her sisters on Madison were the only ones to have elevators by 1911. The buildings on the side streets were generally smaller, and their prestige certainly declined as one neared Park Avenue, which had the unsightly open tracks of the Harlem Railroad. (See Figs. 15 and 17) Survey maps provided by the Mount Sinai Facility Design and Construction Office, show common frame steps between the airshafts of some of these buildings, leading to a narrow yard where laundry was hung. Some had stores at or below street level, as evidenced by the label "show window" (E.g. Survey 58-60 East 99th Street).

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[1]During this period, the word tenement was not a pejorative term. It referred to a multiple-family dwelling . The modern equivalent is apartment house.

Although many of the buildings had their ground floors adapted for commercial use, these apartment buildings stood until the late 1960s and early 1970s, by which time the expanding Mount Sinai Medical Center acquired the properties. The last remaining building on the study site, at 57 East 98th Street (Lot 27) was demolished in 1973, to make way for the present parking lot (Dem#221-1973). The presence and survival of historical cultural resources will discussed in the following section.

VI. CONCLUSIONS AND RECOMMENDATIONS

Prehistoric Research Potential

There is overwhelming evidence that Native Americans exploited the natural resources of Coastal New York for thousands of years before Europeans arrived. Specifically, there is evidence that portions of northern Manhattan - in the general vicinity of the subject parcel - were utilized by Native Americans before European colonization. Their paths and place names survived in the project area to be recorded and used by early European visitors.

Settlement pattern data of the prehistoric culture periods indicate a strong association between habitation and processing sites and: (1) the confluence of two watercourses; (2) the proximity to a major watercourse; (3) the proximity to a marsh resource; and\or (4) well-drained, elevated land. A review of the attached maps shows the project site straddling a small unnamed creek and marsh, with access to a major estuarine biome, a known resource for Native Americans, and within immediate proximity to a major watercourse - Harlem Creek and the East River. It is likely that the estuarine resources of the site were tapped. Finally, the documented and inventoried archaeological sites (habitation and processing) in Coastal New York occur on raised, well-drained land. According to the earliest available maps of the area, the project site included dry, elevated areas on the slopes of the bluffs which surrounded the creek and ribbon of marsh. As archaeologist Richard Hunter also proposes, the adjacent bluff tops would also have provided good vantage points, "an important factor in tracking game and other aboriginal groups" (Hunter 1990:3-4).

Historical Research Potential

In order to determine the potential for extant archaeological resources of the historical period, a compilation of horizontal and vertical disturbance through time has been made, using maps and building construction records. Unfortunately, much of the construction information normally kept by the Building Department was discarded or lost at the time of or subsequent to the demolition of the original tenement buildings when the present parking lot was built. Early survey maps of five former lots now incorporated into the project site were provided by the Facility Design and Construction Office of the Mount Sinai Medical Center. However, since much of the construction data is missing, atlases and insurance maps as well as early photographs have become extremely important sources of disturbance data.

Historical archaeology of homelots is often undertaken in urban settings. The water and sewer facilities available up through the 19th century, namely wells, cisterns and privies, have

become valuable time capsules for the archaeologist, for once they outlived their utility to the household, they were inevitably used as convenient depositories for household refuse, ranging from broken tools, ceramics and glass, to animal bones. When such an archaeological resource is uncovered, its analysis can provide insights into the everyday life of the City's past, particularly when used in conjunction with documentary evidence of the household's owners and inhabitants.

In order to conclude whether the hypothesized use of privies, wells or cisterns is plausible in a given context, it must first be determined whether sewer and water lines were present which would eliminate the necessity for the digging of these shaft features. Due to the late development of the Mount Sinai Multipurpose Building Site, municipal water and sewer lines were already in place before any of the early 20th-century tenement buildings went up. Furthermore, the cut-and-cover excavations performed for the installation of these utilities would most likely have destroyed any subsurface archaeological resources beneath the streets. Madison Avenue had sewer and water lines by 1889, and Park Avenue by 1897 (Robinson 1889 VI:20; Bromley 1897:32), East 99th Street had water and sewer lines by 1902, before any structures had been built there, while 98th Street had only water lines in 1902, the tenements built along East 98th Street could have easily availed themselves of the sewer services offered on the Avenues. (See Fig. 15). The detailed survey maps of 54-56, 58-60, 62-64 and 66-68 East 99th Street, and 63 and 65 East 98th Street, dating from the first two decades of the 20th century, support this conclusion. The maps show frame stairs, fences, retaining walls and clothes poles, but show no privies, wells or cisterns on the properties. Therefore, there is no indication that any privies or cisterns would have been dug to service the tenants of the 20th-century apartments.

As described in the Historical Period section, and seen in Figures 12-14, many of the squatters shacks were surprisingly substantial with residence of apparently long duration. Although none of the photographs show squatters on the project site, it was the last property in the area to be developed, and if squatters were in the area the lot would have been available to them. Although water was eventually available from hydrants, for many residents it was easier to dig holes "a little below the surface" (Plunz 1990:55), but on the project site this was not necessary since there was a creek close by. This area of Manhattan abounded with streams and natural springs, with one spring known to have been at what is now 96th Street and Park Avenue. Given this situation, it is also unlikely that any sort of cistern system was built, given the complicated nature of such a project and the semi-permanent nature of the residence. Rain barrels are a more likely source of water, and a barrel possibly used for this purpose stands before the leftmost shanty shown in Figure 12. Since they were not legal dwellings, the shanties did not have access to municipal

sewer lines, even after they were installed. Privies would have been necessary in such conditions. These also would have been shallow excavations, of probably only a few feet considering the nature of the topography (a fairly high water table with a swamp nearby), and the freedom to place privies in a fairly wide radius around the dwelling. Information from such features which have survived subsequent subsurface disturbances would provide invaluable data concerning and insights into the lifeways of squatter settlements.

The early 19th-century structure along the "Road to Harlem Bridge" (See Fig. 10) would have operated under constraints similar to that of the shanties. Water would have been gathered from the creek, shallow wells, or above-ground cisterns rather than deeply-buried cisterns. Privies were certainly dug, but they also would have been relatively shallow due to the high water table and rural setting. Although at least one early privy in Lower Manhattan was reported to have extended to a depth of approximately 14 feet, an average depth of less than ten feet was more likely the normal depth-below-grade in an urban setting. In an uncrowded rural setting, such as the project site c.1810, the freedom to move a privy location precluded the need to construct deep privies (Personal communication, Joan Geismar, 2-5-93). If left undisturbed until the present, these shallow privies would provide important data concerning taverns/inns or households from the early Federal period.

Disturbance Record

As discussed in the previous two subsections, the Mount Sinai Proposed Multipurpose Building Site has an extremely high probability of having hosted archaeological resources from both the prehistoric period, as well as from the first decade of the 19th, the second half of the 19th and early years of the 20th centuries. However, before any recommendation can be made regarding the present archaeological potential of the study parcel, there must be a consideration of documented subsequent site disturbance, and whether this disturbance has been severe enough to eliminate the archaeological potential. This determination is based on information from building records, maps and photographs showing earlier site conditions and boring logs.

According to the 1951 Sanborn real estate atlas, each of the tenements erected on the property had a basement. (See Fig. 18) Although none of the building footprints shows the entire lot covered by the structure, the narrow airshafts between, and the slightly wider spaces behind the buildings (12′ to 10′ and narrower), would have been insufficient to protect these open areas from the same subsurface disturbance undergone by the rest of the lots during massive foundation construction.

To determine the depth of the disturbance, which can vary as

much as 5' from a partially aboveground basement to a completely below grade construction, the best source is Building Department records. Unfortunately, many of these were missing from the block and lot folders, a loss probably related to the demolition of the original structures, and the amalgamation of the different lots into one large lot. After these procedures these records are useless to all but the historian and archaeologist, and often discarded. However, probably because it was the last tenement remaining, demolished in 1973 (Dem#221-1973), some information was available concerning Lot 27, 57-59 East 98th Street, the third building from the corner of Madison and 98th. (See Fig. 18) Built in 1904, the new building permit shows the cellar extending to 10' below curb level (NB#706-1904). The Mount Sinai survey maps provide cellar depths for the four buildings with matching footprints on 99th Street (54-68 See Fig. 18). These structures all had partially aboveground basements, ranging from 4'8.5" below curb level at 62-64, to 5'1" at 58-60.

The only other source for data on basement depth is photographs. A photograph from c.1927, showing the building in the project site standing at the corner of Madison and 98th Street was located by Barbara Niss, the archivist for Mount Sinai Medical Center. It shows this building with small cellar windows at sidewalk level and a low stoop leading to the main entrance on the ground floor level (Personal communication, Barbara Niss, 1-26-93). This suggests a partially aboveground basement with a depth of approximately 7'or less. Another photograph shows the presence of raised stoops all along the Madison Avenue frontages with on-grade shops, suggesting fairly shallow basements (New York Public Library microfiche 0911-F2).

Given a known depth of construction disturbance at between 4'8" and 10' below curb level, it is next necessary to determine whether any pre-construction cultural resources might have survived these disturbances. This is accomplished by studying the existing subsurface strata as revealed in boring logs (See Appendix), and comparing them with pre-disturbance topographical maps. Boring logs for the project site were provided by the Mount Sinai Medical Center. Another log, this time for the adjacent multi-story garage was also found in a report in the block and lot folders of the Building Department (NB#25-1974, LETCO c.1974). Although often borings show that the water table extends into the artificial fill level, indicating that the original surface has been removed or was simply under water, this cannot be determined here. Although one log shows the water level between elevations of 23.6' and 26.8'(1988) and another 24.9' to 32.2'(1992) (See Appendix), due to construction on the adjacent blocks, the watercourses in the project area have been diverted, strongly affecting the depth of the water table (Personal communi-cation, Nels Berg, 1-22-93). The LETCO study, which documents large variations in groundwater levels from an elevation of 30' to 45', suggests that "groundwater encountered may be perched due to the variable permeability of the

fill and underlying rock stratum" (LETCO c.1974:6).

The borings show that a layer of bedrock, gray schist with occasional quartz inclusions, underlies the entire site, providing a topographical "skeleton." The contours of the top of schist layer generally conform to the picture of site topography that we have derived from the early maps. The bedrock elevations are highest in the southwestern (6.1′ to 13′) and eastern (1.8′ to 32.2′) sections of the site with a depressed area (1.9′ to -17.5′) between the two elevated parts. This depressed area approximates the course of the old creek and marsh, while the elevated areas to each side represent the old hills and bluffs. This "valley" also slopes downward toward the north, just as the old creek flowed northward toward Harlem Creek. (See e.g, rock surface profiles in "Generalized Groundwater Profiles A-A′ and B-B′" in Appendix) The borings on the adjacent property to the east show a continued rise in schist elevations as one continues east. Before the construction of the multi-level garage there was even a rock outcrop 10′ by 20′ extending 2′ above the surface (LETCO c.1974:2). These areas would correspond to a section of the large bluff where Bolton located the village of Konaande Kongh. (See e.g. Fig. 7, where the bluff slope is indicated by the band of hatching west of "Fourth Avenue," now Park)

As described in the Environmental Setting section, the retreat of the last glaciation covered the bedrock with a layer of glacial till (sand, silt, pebbles, boulders), which was generally thickest in the narrow valleys, and thinnest on the hills and rock outcrops. The boring logs show a layer of till (gray and brown silty sand, with gravel and sometimes boulders) between the schist and the fill layer. The natural surface of this till layer, the post-glacial ground surface, should conform roughly to the contours of the bedrock, but be generally thicker in the depressed areas, resulting in the narrow valley topography described but with a less extreme grade between valley floor and bluff top - a general softening of contours - and a less drastic difference in elevation between extremes.

When grading operations were carried out at the beginning of the 20th century, to create the gradually sloping contours present today, a fill layer placed directly atop the original surface would be the thickest in the depressed area or valley, and gradually thinner along the slopes of the surrounding hills, because their elevations would have been closer to the elevation desired by the builders. Although the fill layer ranges in thickness from 8′ to 28′, these measurements do not conform to the hypothesized site topography. There appears to be no correlation between depth of bedrock and the size of fill layer. In the most depressed areas of the site, the fill can be fairly thin (B-2 10′ of fill, schist el. -15.9′; B-3 12′ of fill, schist el. -10.7′), while in the more elevated sections just the opposite can occurs (B-6 25′ of fill, schist el. 6.7; B-22 17′ of fill, schist el. 12.5′). In fact, the

elevations of the top of the till layer, taken as a whole, conform better to the present surface contours, which slope from elevations of approximately 55' along 98th Street, to about 45' along 99th, than they do to the bedrock layer. Rather than sloping down in an easterly direction to the "valley," and then sloping up to the bluff also in an easterly direction, the top of the till layer slopes down from 98th Street toward the **north**, and then up slightly at 99th Street. If contour lines were drawn they would be perpendicular to those expected naturally. Therefore, it appears that the original surface was considerably altered before the deposition of fill.

If the narrow valley were still present at the turn of the century, before construction it would have been necessary to level the construction site. The only reasonable explanation which would conform to the evidence of the boring logs is a rough grading of the project area before the deposition of fill. During the early part of this century, before the advent of bulldozers and other large earthmoving equipment, this grading would have been done by hand, resulting in a rather uneven surface. Another reason for the unevenness is that since the apartment buildings were built at different times, the regrading probably went on over a period of many years. Several feet of the surface of the elevated areas of the site, which included whatever was left of the squatters' homes, were probably shoveled into the existing depression, adding to the thickness of the till layer. At this point the elevation of the project site would still have been below street level, and as the borings show, in some places substantially below the elevation of the deepest basements. The photographs of the shanties (See Figs. 12-14), show that on the adjacent blocks the newly paved streets were higher than the block interiors. This was a common occurrence throughout the city, and the owners of land along new streets were obliged by the city to raise or lower their property to the level of the new road, and assessed the cost (Landowner 1818:17). A solution to this problem would be to use fill from another source, in this case, construction fill. This would account for the fact that the existing fill layer does not conform to the known depths of disturbance. When the site was filled to the desired elevation, the basement foundations were laid, and fill was deposited around the completed structure until it was level with the street, or at least with adjacent open areas between the tenements. When these structures were torn down, the debris was used to fill in the existing basements.

Given this scenario, the regrading process would have levelled the elevated areas of the project site, precisely the sections which would have been the most attractive to prehistoric man. Furthermore, because prehistoric remains recovered in southern New York tend to occur in shallow deposits, they are particularly vulnerable to disturbance by regrading activities. Because these potential archaeological remains would have been buried shallowly in the areas targeted for the regrading's greatest subsurface

disturbance, the possibility of survival of any such prehistoric archaeological resources is low. Although the regrading might have placed a layer of till over the lower-lying areas of the project site, these sections would have been sloping or marshy, an unlikely area for processing or camp sites. Perhaps stray finds of projectile points might be found there, but these artifacts would be out of context, and provide no insights into the prehistory of Native Americans.

Similarly, the lower slopes of the bluffs and the marshy areas of the project site, which would not have been affected by regrading, were not considered attractive areas for construction by historical New Yorkers either. The shallow shaft features expected from the early 19th-century structure[s], as well as those from the shanty-dwellers of the late 19th century would most likely have been destroyed during the regrading process described above. Although artifacts may have survived the regrading, the operation would have removed them from their chronologically discrete strata. Like any stray prehistoric artifacts, they would be out of context, providing little information concerning the lifeways of the historical residents.

Based on our extensive survey and study of all available information on the proposed site of the Mount Sinai Medical School Multipurpose Building, we conclude that the project site is not sensitive for cultural material from the prehistoric or historical periods, and therefore, there is no potential for adverse impact.

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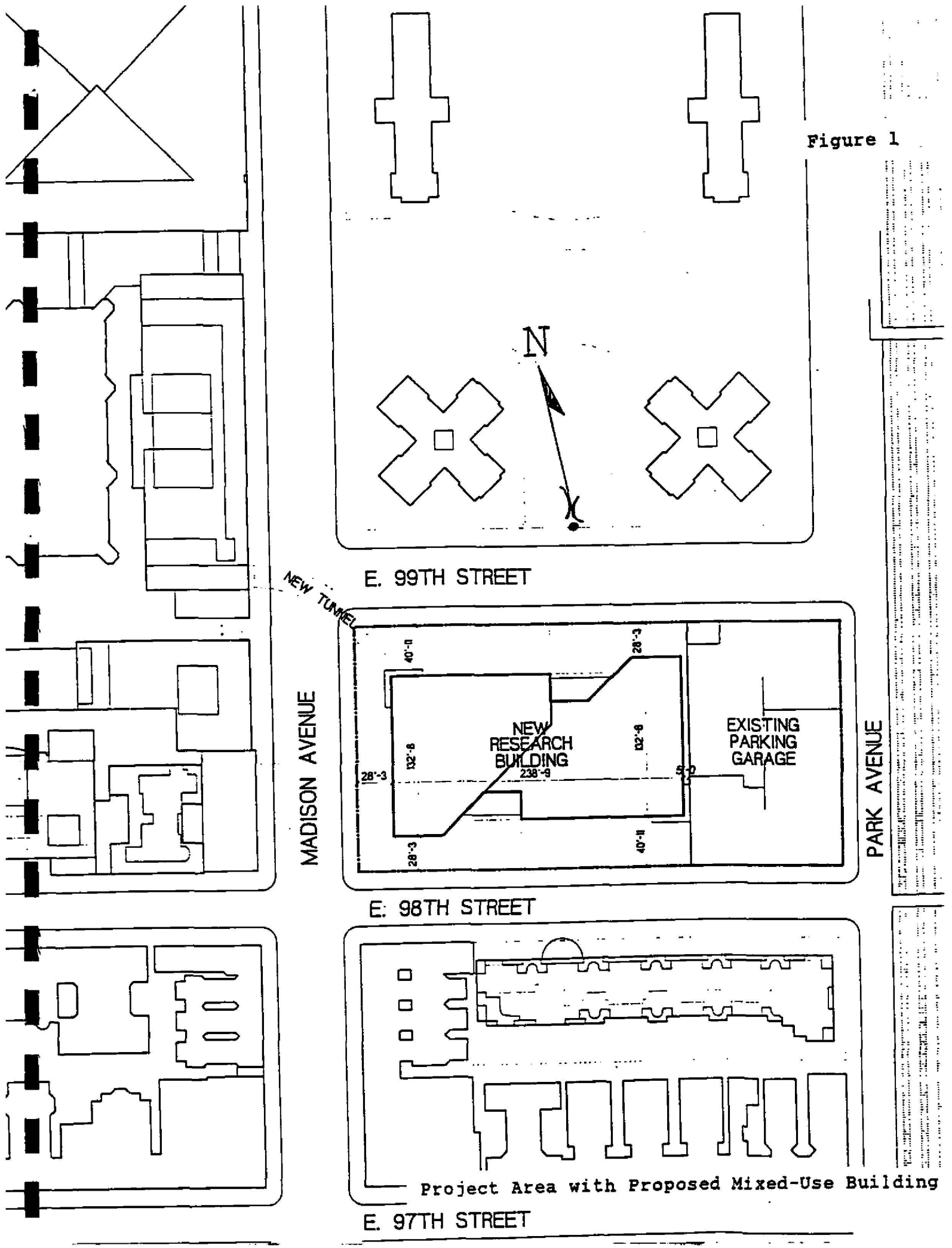
Figure 1



Project Area with Proposed Mixed-Use Building

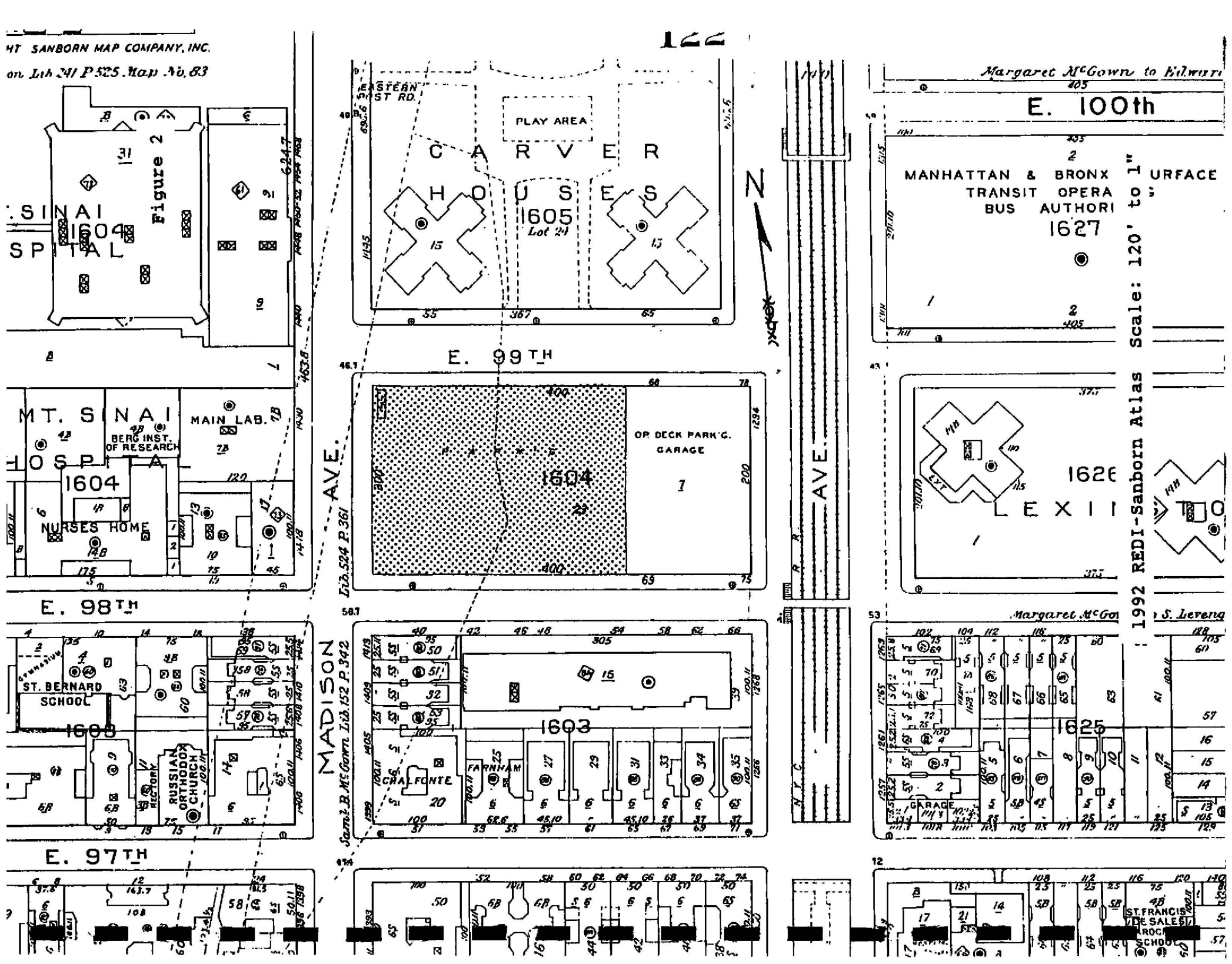

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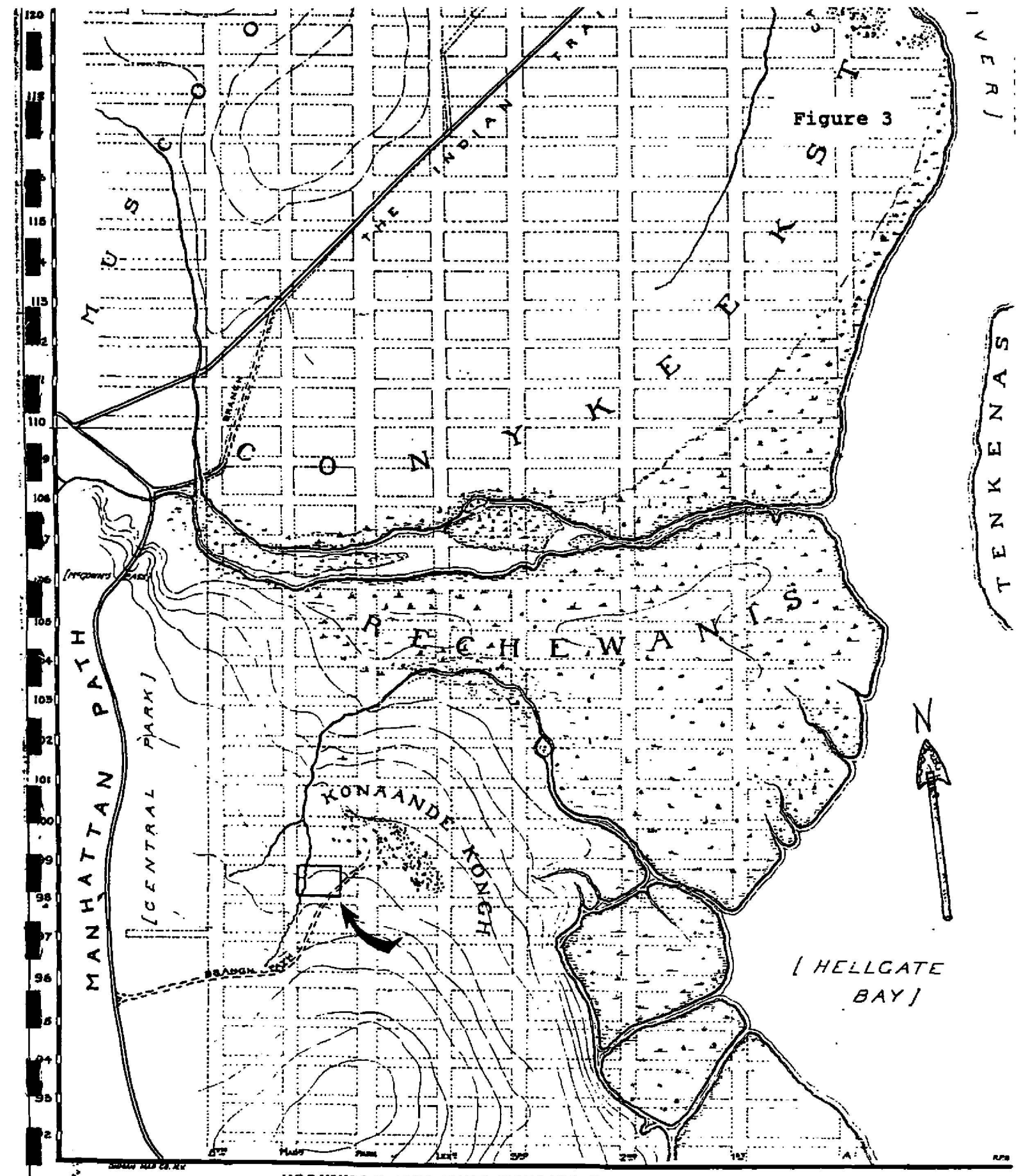
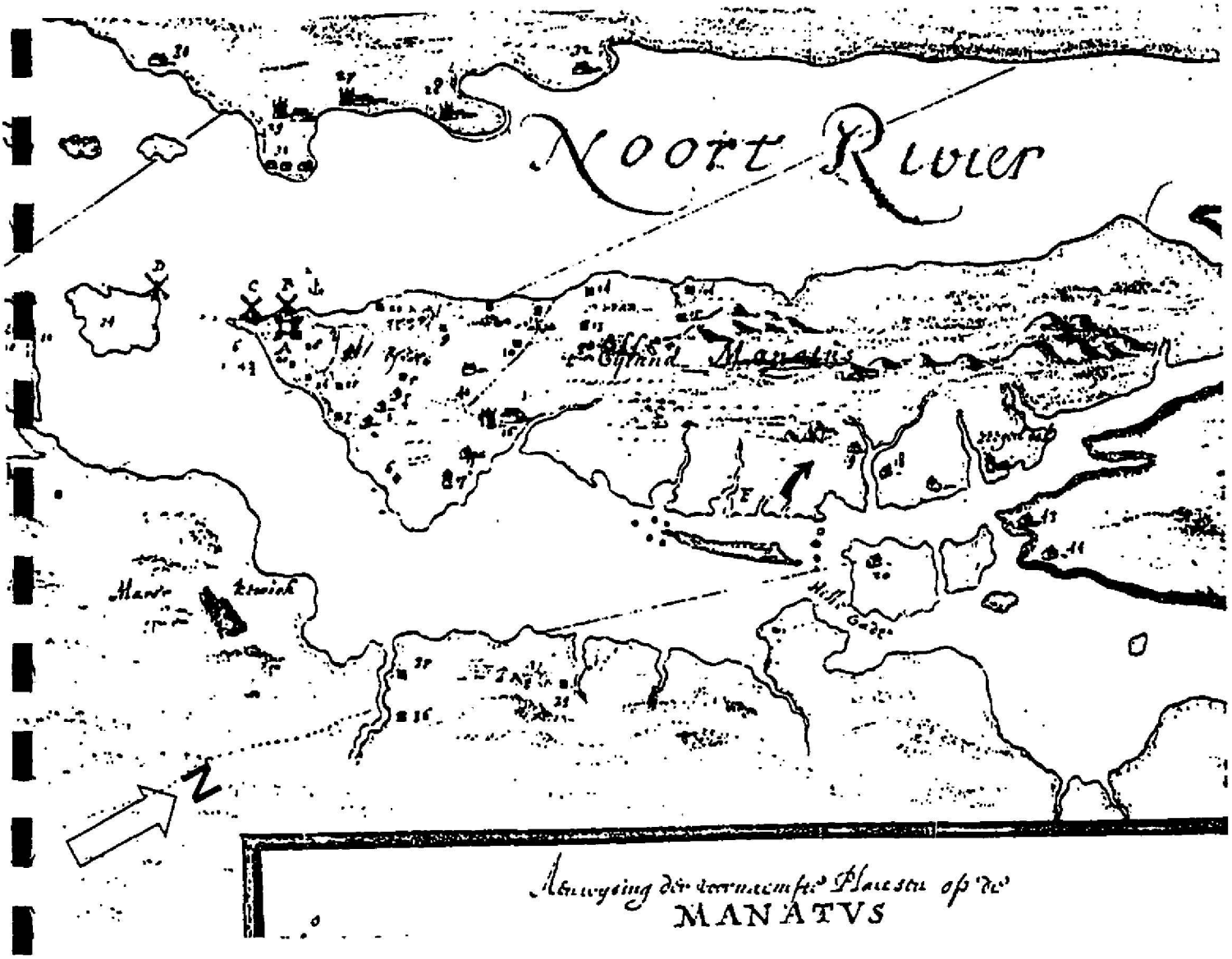
Figure 2
MT. SINAI HOSPITAL
1604
MAIN LAB.
BERG INST. OF RESEARCH
NURSES HOME
E. 98TH
E. 97TH
ST. BERNARD SCHOOL
1608
RUSSIAN ORTHODOX CHURCH
MADISON AVE.
Sam'l B. McGown Lib. 152 P. 342
EASTERN ST RD.
PLAY AREA
CARVER HOUSES
1605
Lot 21
E. 99TH
Lib. 524 P. 361
OP. DECK PARK'G. GARAGE
1604
1603
CRAIGFONTE
FARNHAM
PARK AVE.
N. Y. C. R. R.
Margaret McGown to Kilwarr
E. 100th
MANHATTAN & BRONX SURFACE TRANSIT OPERA BUS AUTHORI
1627
1626
LEXII
1625
GARAGE
ST. FRANCIS DE SALES ROCK SCHOOL
Scale: 120' to 1"
1992 REDI-Sanborn Atlas



YORKVILLE AND EAST HARLEM IN ABORIGINAL TIMES.

from: R. Bolton, Indian Paths in the Great Metropolis

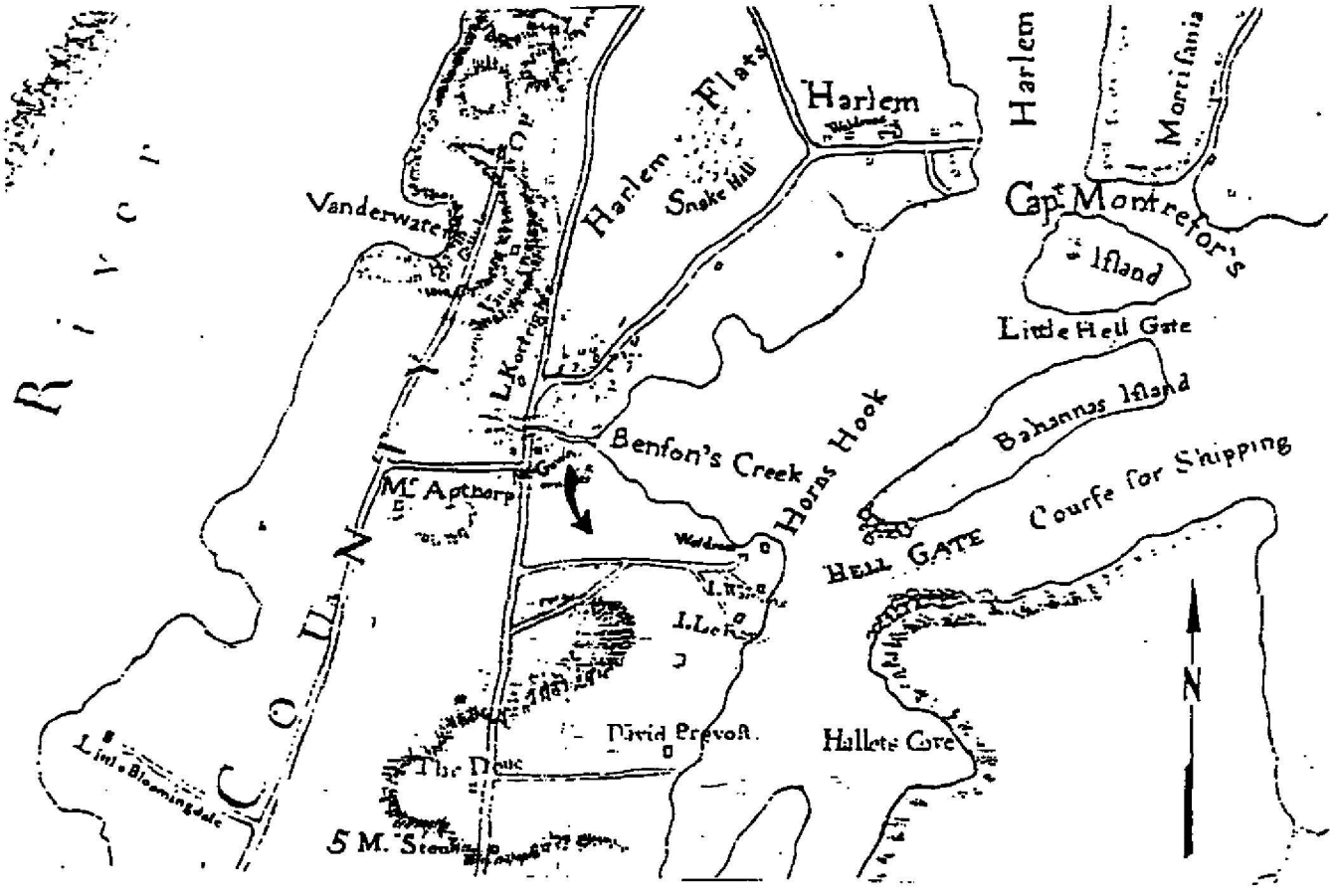
Figure 4



Manatus Map, 1639
Arrow indicates approximate location of project area.

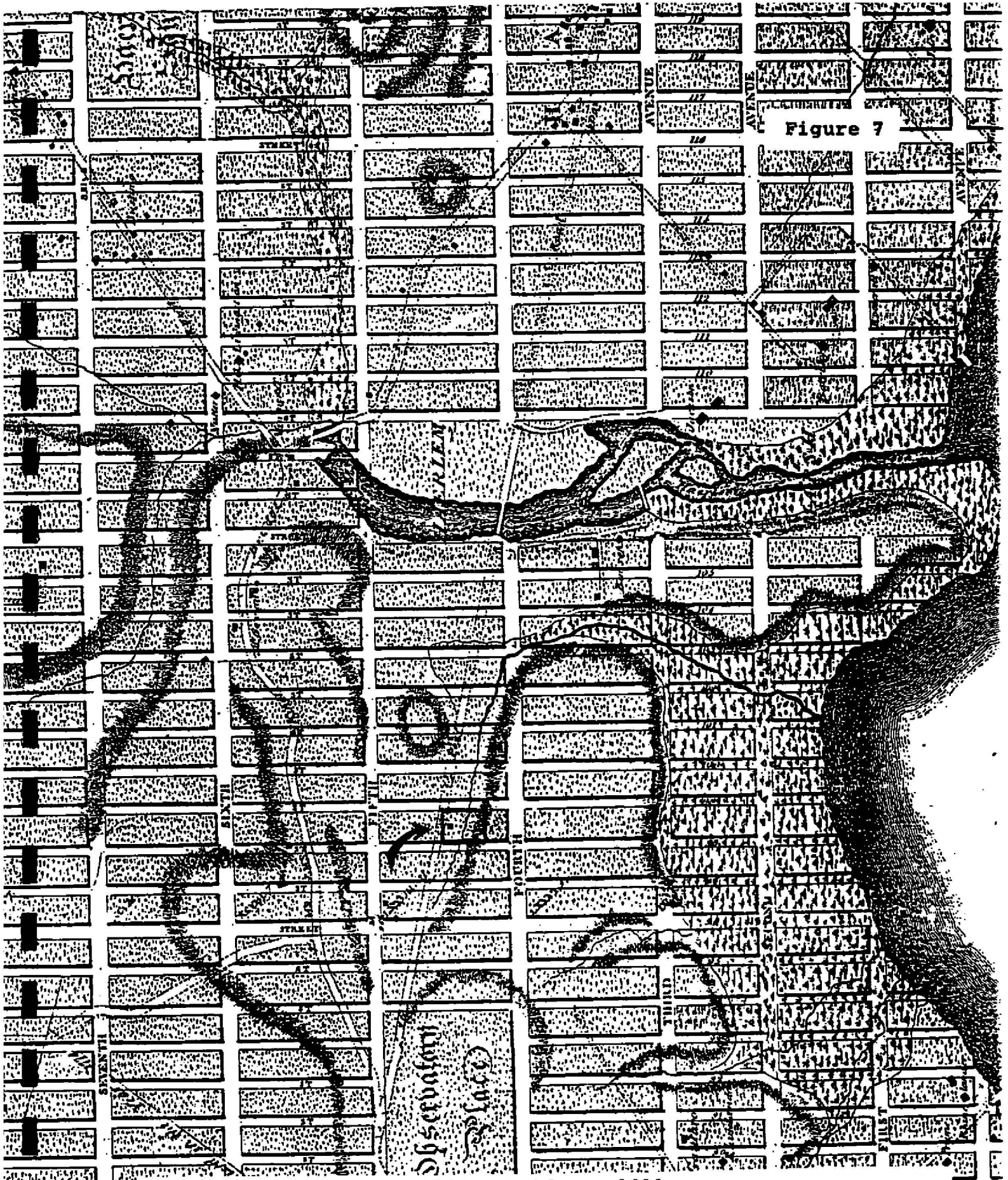
Reproduced from John A. Kouwenhoven's COLUMBIA HISTORICAL PORTRAIT OF NEW YORK, 1953

Figure 5



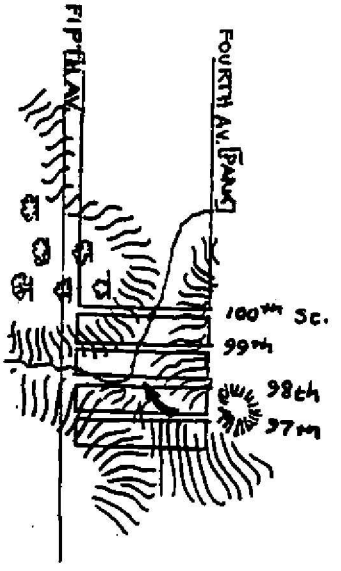
A Topographical Sketch of the Island of New York with Part of the Circumjacent County, 1775. Reproduced from Hunter (1990:III.3). Scale (approx.): 1 inch = 1 mile.

British Headquarters Map, 1782. Reproduced by B. F. Stevens, 1900. New York Public Library, Map Division.



Commissioners' Map, William Bridges, 1811
(Map of the City of New York and Island of Manhattan as laid out by the Commissioners Appointed by the Legislature April 3d 1807)

Figure 8



KEY:

WOODS, FRUIT TREES, ETC

MOUNTAINS & HILLS

VALLEYS WITH RUNNING STREAMS

STS & AVS. "estab.d by ordinance" but not open or regulated.

DETAIL FROM:

TOPOGRAPHICAL MAP OF THE CITY AND COUNTY OF NEW-YORK AND THE ADJACENT COUNTRY

J. H. COLTON & CO. 1836

SCALE: 1,000' to 3/4"

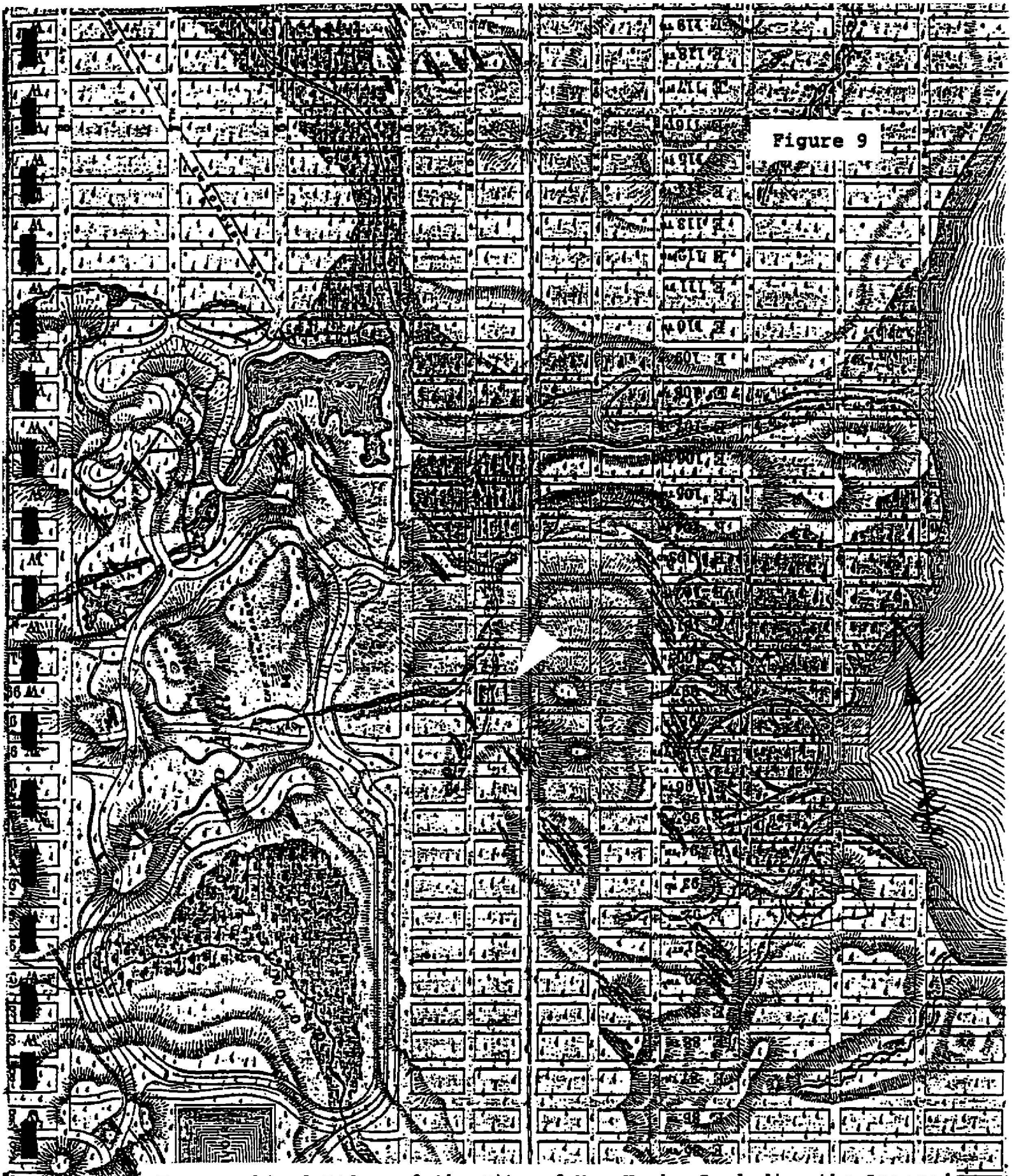
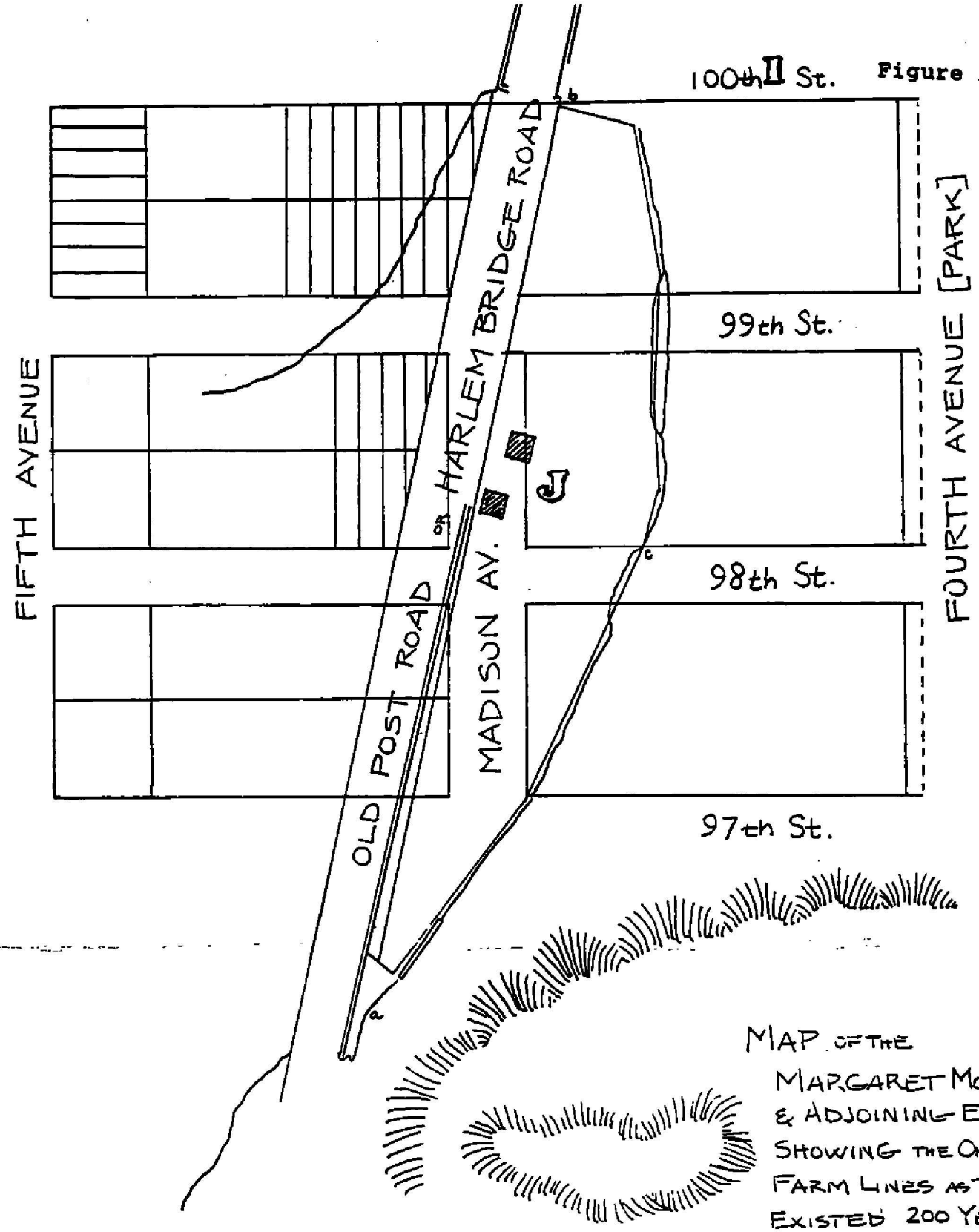


Figure 9

Topographical Atlas of the City of New York, Including the Annexed Territory Showing Original Water Courses and Made Land
Egbert Viele, 1874

Figure 10

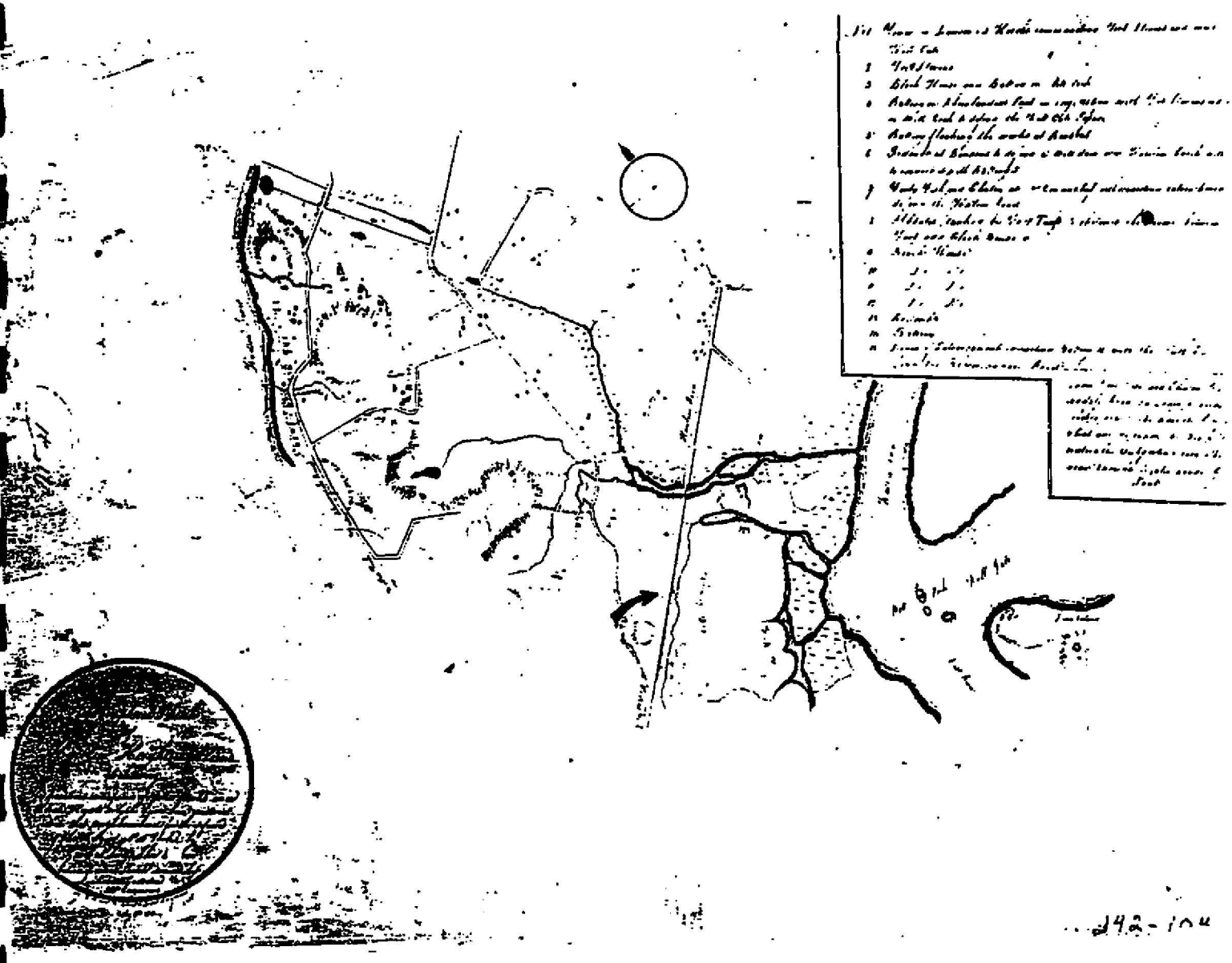


MAP OF THE MARGARET McGOWN & ADJOINING ESTATES SHOWING THE ORIGINAL FARM LINES AS THEY EXISTED 200 YEARS AGO 1883.

FARM MAPS - COLLECTION OF THE NEW YORK PUBLIC LIBRARY - MAP DIVISION.

SCALE: 150' to 1"

Figure 11



Military Topographical Sketch of Haerlem Heights and Plains. James Gadsden, 1814. Reproduced from Hunter (1990:III.21). Scale (approx.) 1 inch = 2950 feet.

Figure 12

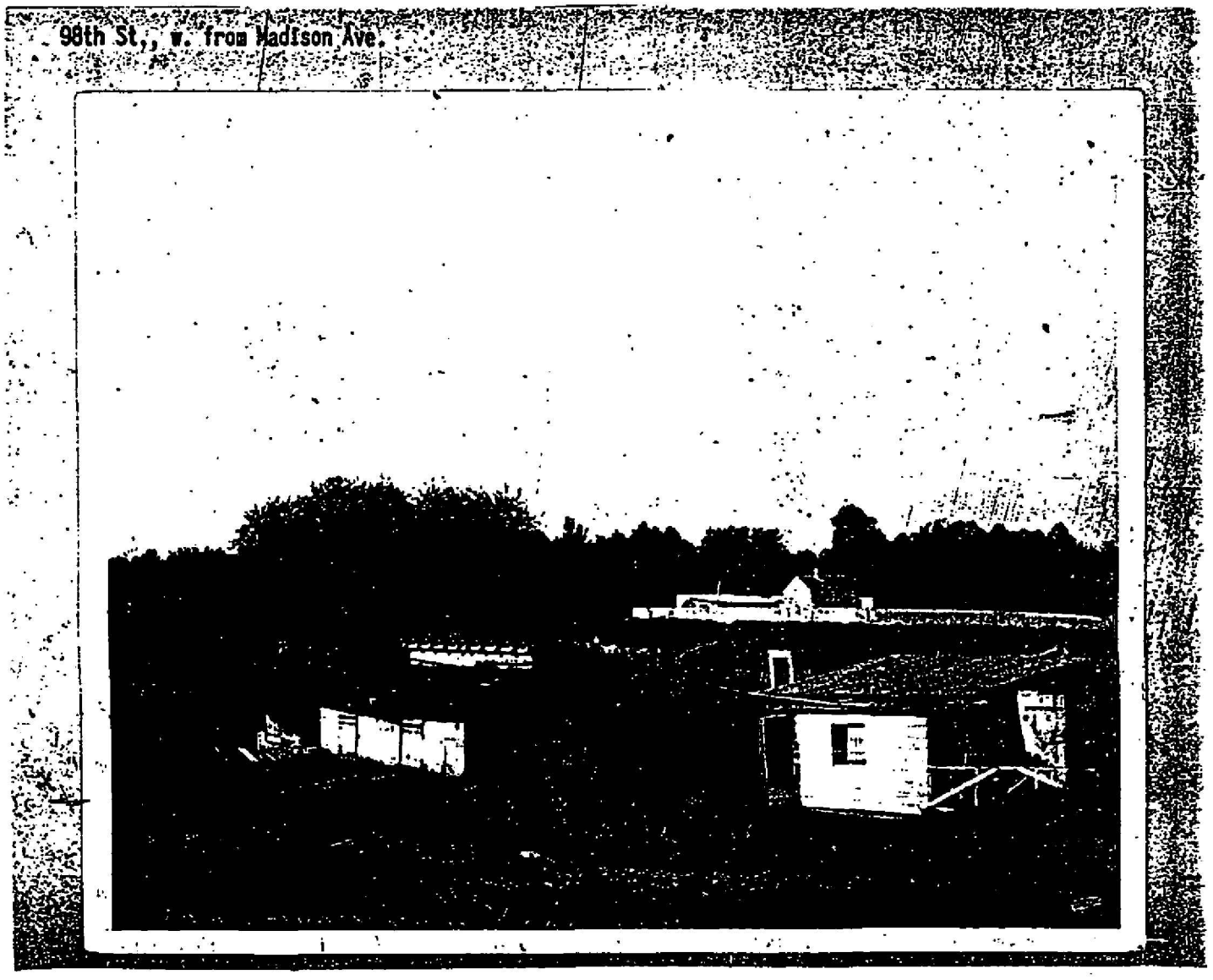
East 98th Street, East from Fifth Avenue, 1893
(New York Public Library, Microfiche 0626-B5)

Figure 13

E. 98 Street S.S. betw. Madison-Fifth Aves.

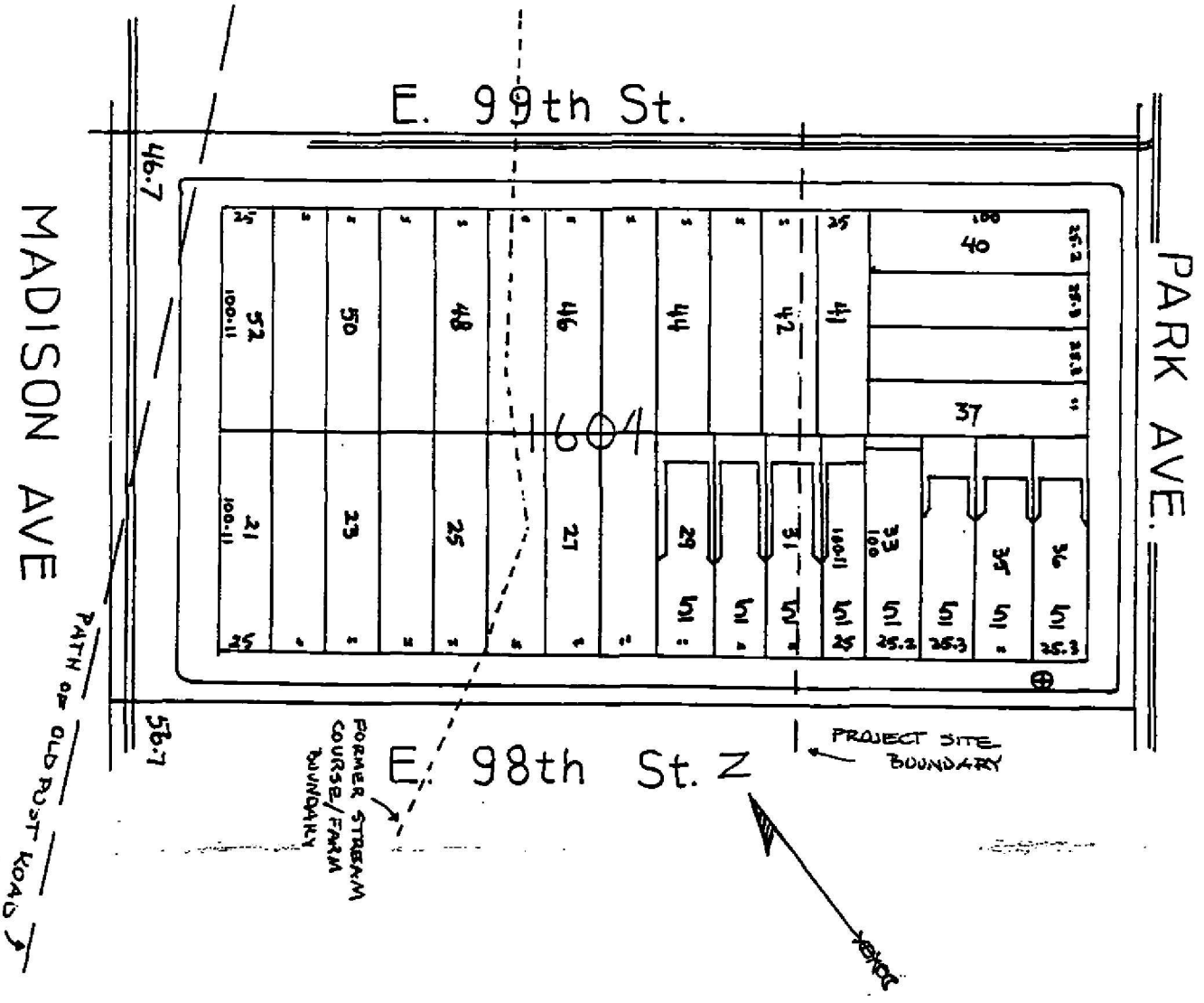
East 98th Street, South side between Madison - Fifth Avenues, 1893 Showing rural conditions prevailing on the present site of St. Bernard's School #4-12 E 98th St. Fifth Av. to right, runs across midground; vacant lots being on this side and Central Park on the far side. In center is a 3-story brick dwelling, #1150 Fifth Av. NE corner of 96th Street. (New York Public Library, Microfiche 0626-B2)

Figure 14



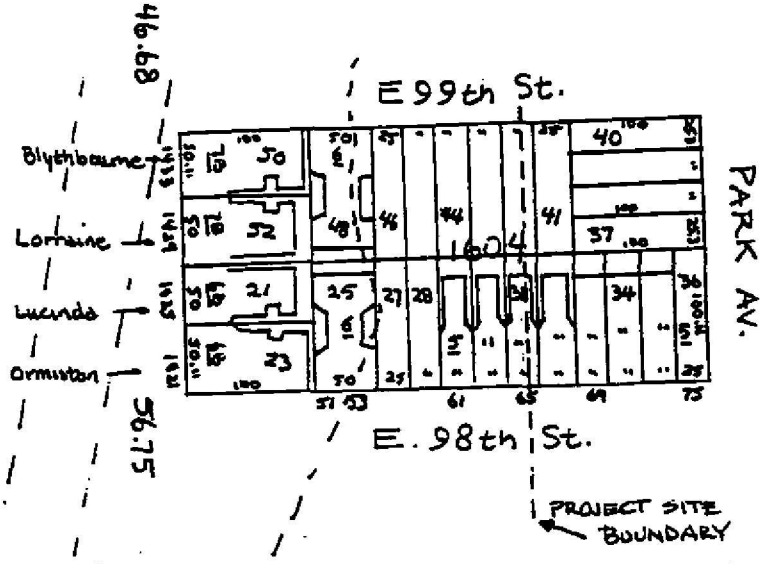
East 98th Street, West from Madison Avenue, 1893
(New York Public Library, Microfiche 0626-B4)

Figure 15



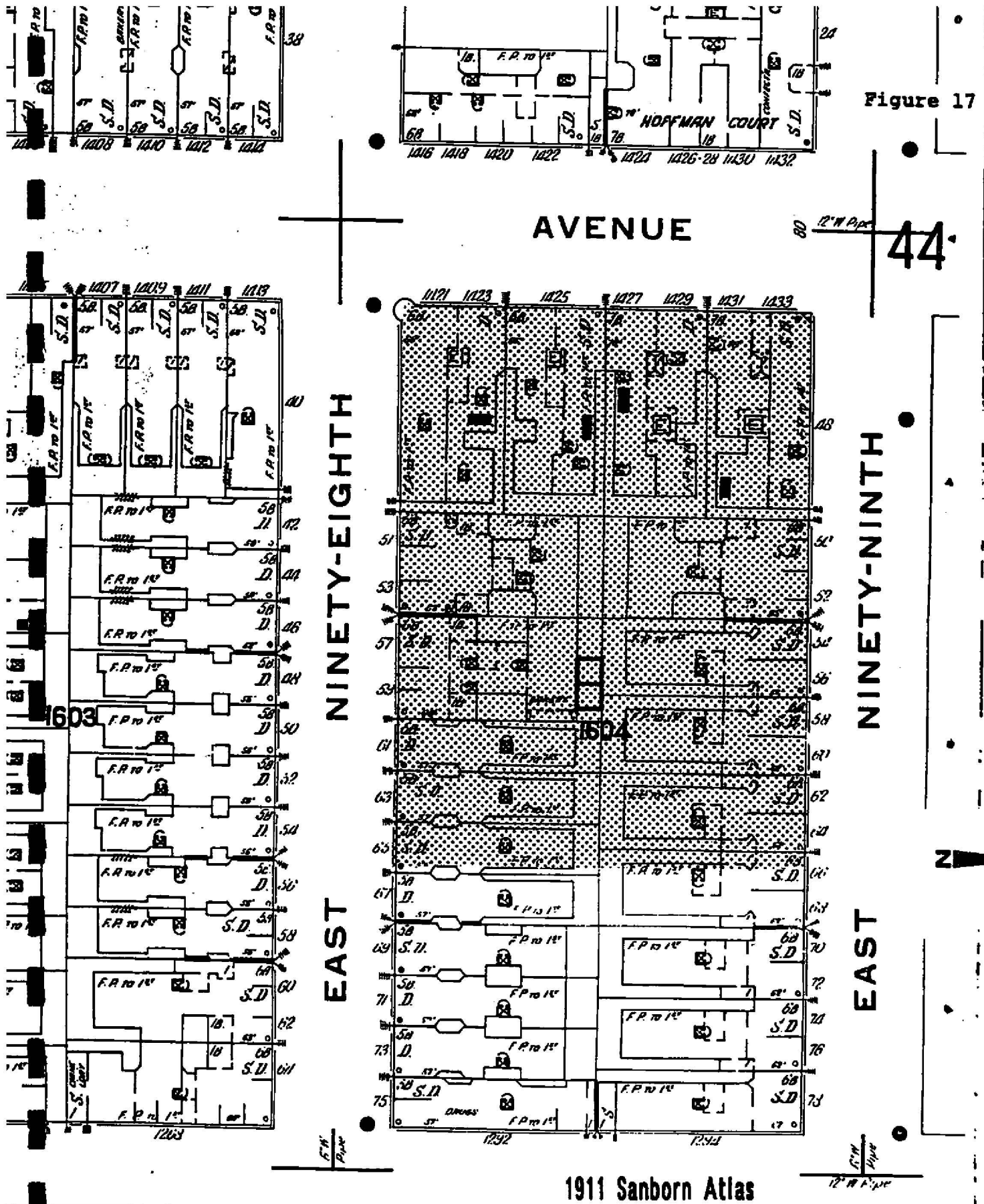
G.W. BROMLEY 1902
ATLAS OF THE CITY OF NEW YORK
VOLUME 3, PLATE 35
SCALE: 80' to 1"
ALL STRUCTURES BRICK
COLLECTION - NYPL

Figure 16



G.W. BROMLEY 1905
ATLAS OF THE CITY OF NEW YORK
PLATE 32
SCALE: 150' to 1"
ALL STRUCTURES BRICK
COLLECTION - NYPL

Figure 17


AVENUE
44
NINETY-EIGHTH
EAST
NINETY-NINTH
EAST
1603
1604
HOFFMAN COURT
1911 Sanborn Atlas
AVENUE

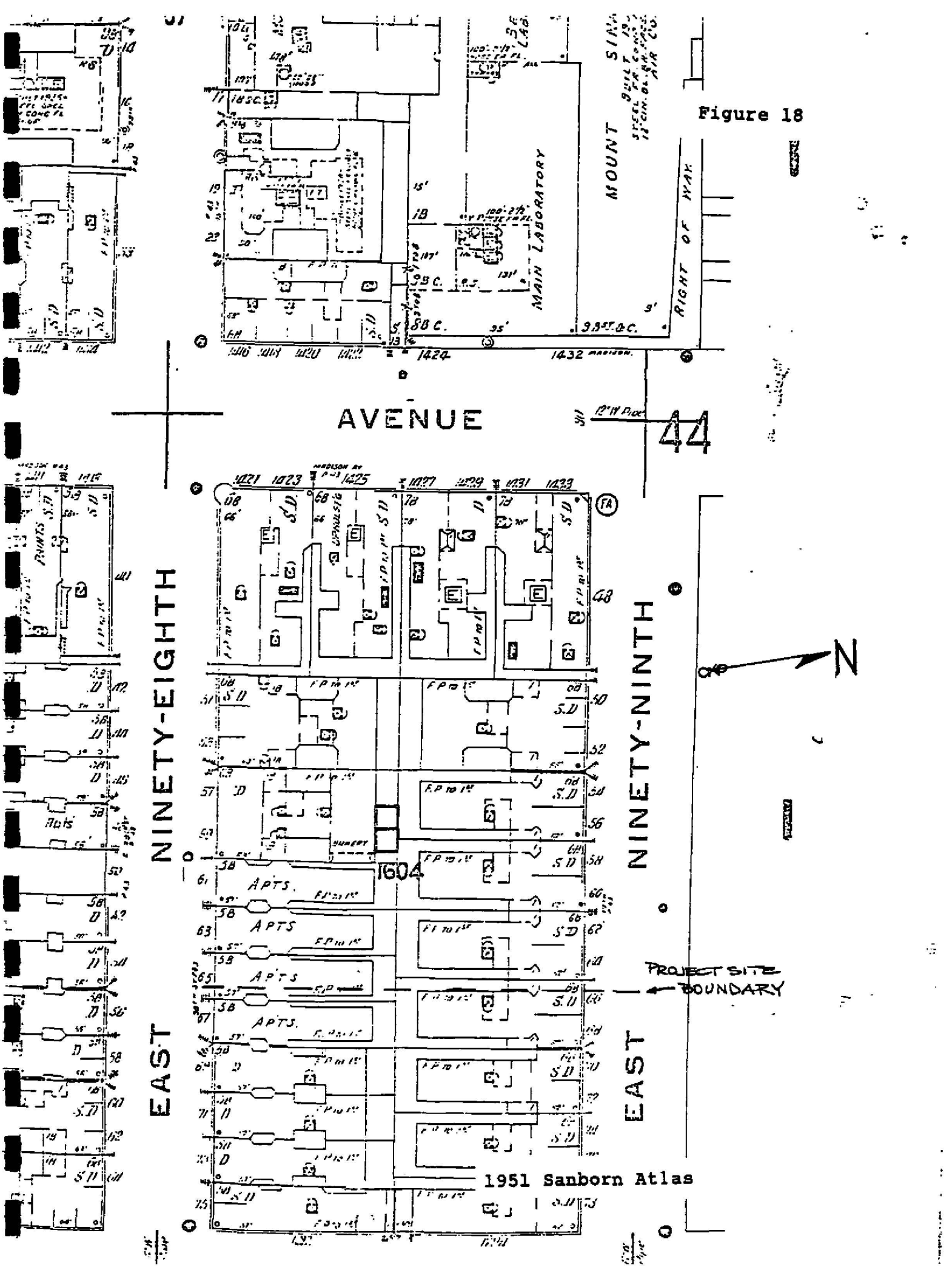
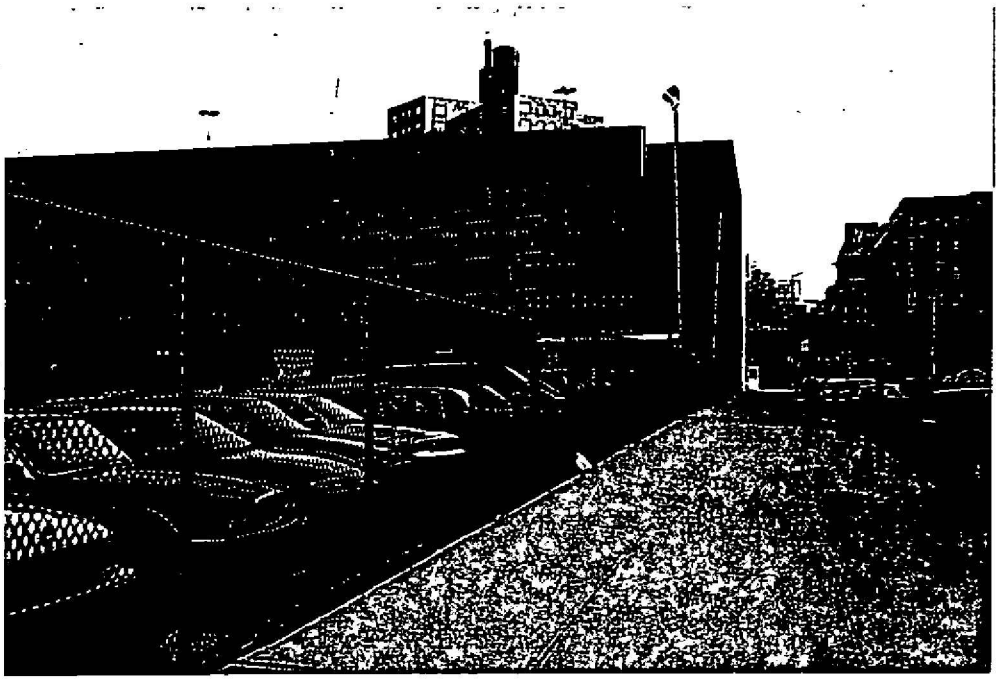


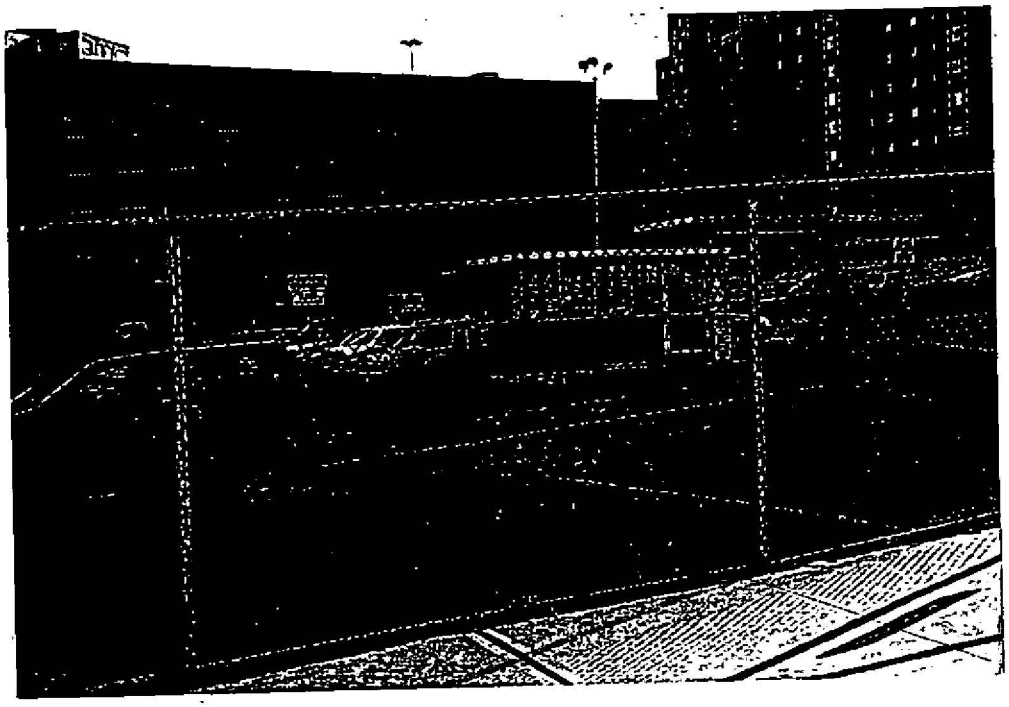
Figure 18

1951 Sanborn Atlas

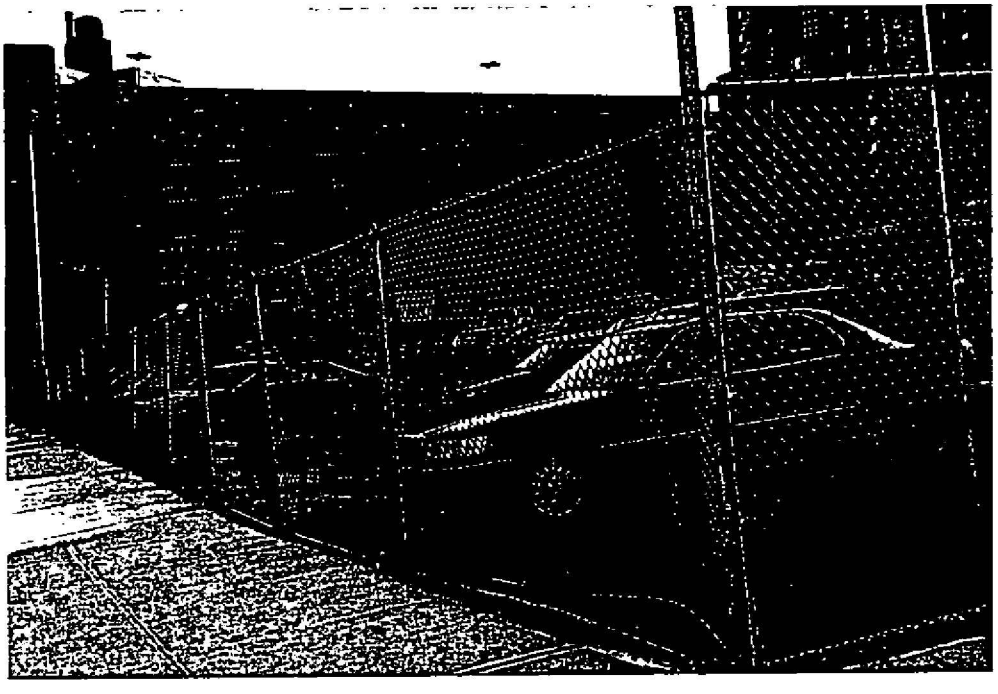
Photograph 1: Looking south along Madison Avenue from corner of 99th Street. Site is to the left.



Photograph 2: Looking east along 98th Street from the corner of Madison Avenue. Site is to the left.

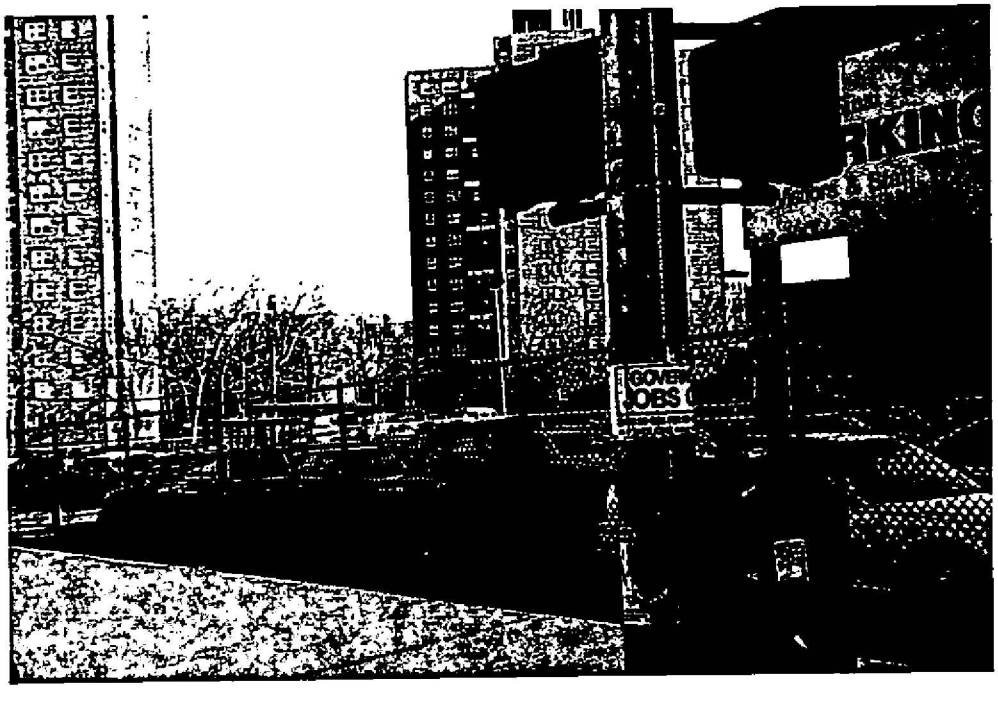


Photograph 3: Looking east across the site from Madison Avenue.



Photograph 4: Looking southeast across the site from the corner of 99th Street and Madison Avenue.

Photographs 5 and 6: Looking northeast at the site from Madison Avenue and 98th Street.



APPENDIX - BORING LOGS

Test Borings for Mount Sinai School of Medicine Housing 4-8-88
Warren George Inc., boring contractor

Abbreviations: f-fine m-medium c-coarse w-with tr-trace org-organic bould-boulders conc-concrete frags-fragments grav-gravel decomp-decomposed

B-1	B-2	B-3	B-4	B-5	B-6	B-7
Fill: sand, brick, conc frags, silt 45.5'to 17.5' w.l. 26.5'	Fill: brick, cinders wood sand 45.2' to 35.2'	Fill: brick cinder wood 45.3' to 33.3'	Fill: brick sand silt 44.8' to 32.8'	Fill: sand brick gravel 44.6' to 32.6' w.l. 23.6'	Fill: brick cinder wood sand gravel 47.7' to 22.7'	Fill: brick cinder sand 46.8' to 32.8'
Black silt & sand, poss. fill to 13.5'	Brown silty gravel-ly f/m sand to 13.2'	Brown silty f/m sand & gravel to 12.3'	Brown fine sand & silt w rock frags, poss fill to 17.8' w.l. 26.8'	Fill: Brown f/m sand & gravel tr org silt & roots & conc frags to 21.6'	Brown silty f/m sand tr gravel & rock frags to 6.7'	Fill: gray silty f/m sand tr conc frags & org silt to 13.8'
Gray/ brown silty f/c sand & gravel to -7.5'	Gray/ brown silty f/m sand & gravel to -15.9'	Gray/ brown silty gravel-ly f/m sand to -10.7'	Brown/ Gray clayey silt & f sand to 14.8'	Brown silt f sand tr org silt to 17.6'	Gray mica schist	Gray clayey silt & f sand to 4.8'
Gray mica schist	Gray mica schist & quartz	Decomp mica schist to -12.7'	Brown silty f/c sand w rock frags	Brown silty f/m sand to 14.6'		Gray mica schist
		Gray mica schist		Decomp schist and schist		

APPENDIX - BORING LOGS/2

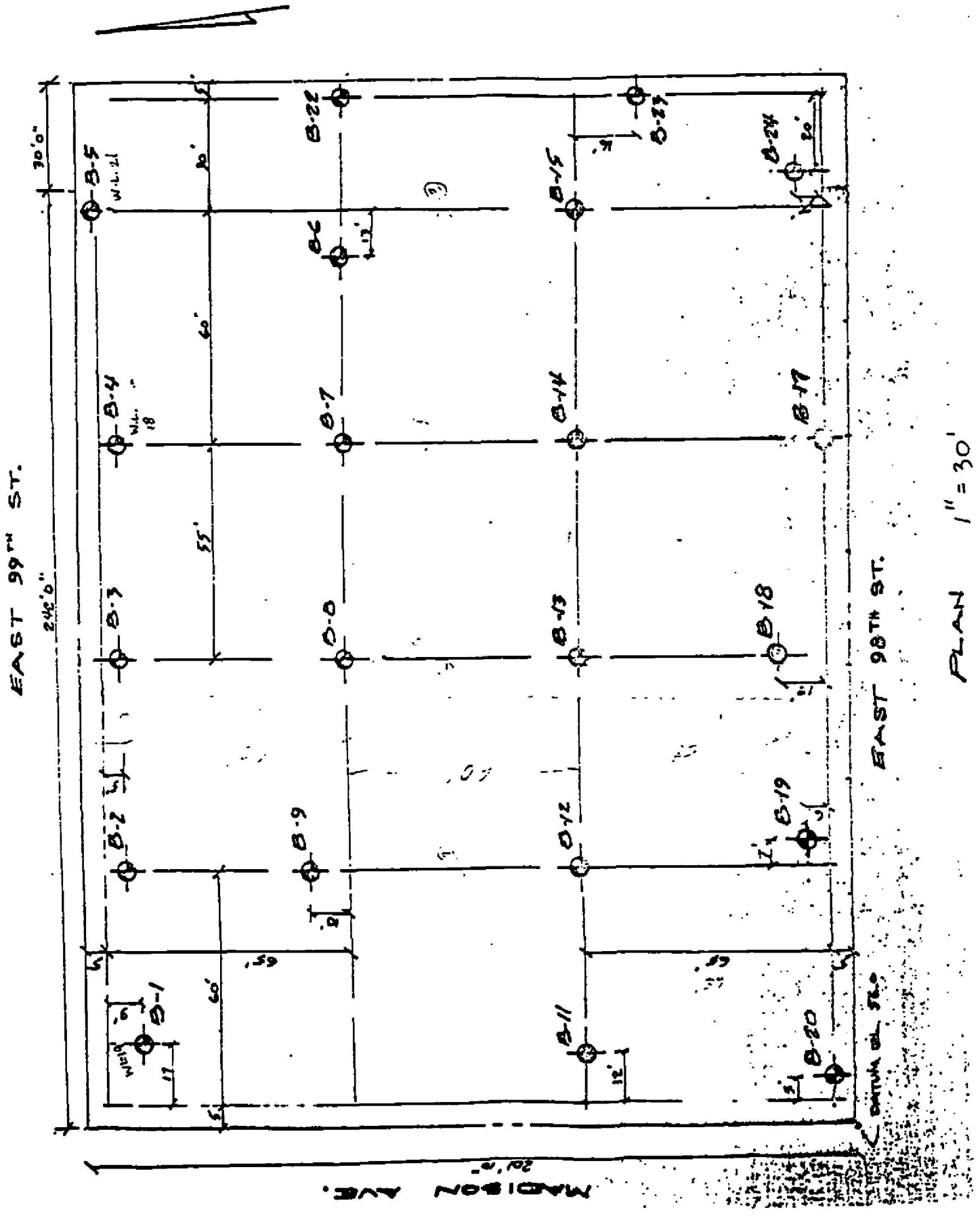
Boring Log 4-4-88

B8	B9	B11	B12	B13	B14	B15
Fill: Brick cinders wood sand 47.5' to 33.5'	Fill: Brick cinder wood 48.5' to 30.5'	Fill: brick cinder wood sand gravel 52.2' to 35.2'	Fill: brick cinder sand silt conc. 52.1' to 38.1'	Fill: brick cinder wood conc. 51.7' to 41.7'	Fill: brick cinder sand conc. rock frags 52.6' to 34.6'	Fill: brick cinders sand 52.7' to 43.7'
Brown/ gray clayey silt silty gravel-ly f/m sand to 15.5'	Fill: f sand & gravel tr brick to 25.5'	Brown/ gray silty f/m sand bould & grav to 7.2'	Brown/ gray f/m sand silt gravel tr to 17.1'	Brown/ gray f/m silty sand gravel bould to - 3.3'	Brown silty grav f/m sand bould to 2.0'	Brown silty grav f/m sand
Gray org. silt f/m sand to 7.5'	Gray/ brown silty and grav f/m sand to -2.5'	Decomp schist and Gray mica schist & quartz	Gray f sand & silt tr org to 12.1'	Gray mica schist	Gray mica schist & quartz	Gray silty f/m sand tr org. to 24.7'
Brown /silty f/m sand gravel bould to -16.5'			Gray/ brown f/m sand silt to 6.1'			Brown silty grav f/m sand to 14.7'
Gray mica schist			Gray mica schist			Gray mica schist

APPENDIX - BORING LOGS/3

B17	B18	B19	B20	B22	B23	B24
Fill: brick cinder wood sand silt 54.6' to 41.6'	Fill: brick sand gravel 54.9' to 37.9'	Fill: Brick cinder wood sand gravel 54.9' to 36.9'	Fill: brick cinder sand 55.3' to 45.3'	Fill: Brick cinder wood sand gravel 48.5' to 31.5'	Fill: brown f/m sand tr gravel 52.2' to 44.2'	Fill: brick cinders 54.4' to 45.4'
Brown silty gravel f/m sand to 20.6'	Brown silty f/m sand & grav w bould to 9.9'	Brown/ gray silty f/m sand tr grav to 18.9'	Brown silty f/m sand to 37.3'	Brown silty f/m sand & grav to 12.5'	Brown silty f/m sand & grav to 32.2'	Brown clayey silt tr fine sand to 41.4'
L. gray sandy silt tr clay to 15.6'	Gray mica schist	Brown/ gray sandy silt to 14.9'	Brown silty f/m sand & grav poss fill to 19.3'	Gray Mica schist tr quartz	Gray mica schist & tr quartz	Brown silty grav f/m sand to 27.4'
Brown silty f/m sand & grav w bould to 9.6'		Brown silty f/m sand and grav w bould to 1.9'	Gray silt & fine sand tr org. to 12.3'			Gray mica schist
Decomp. schist & Gray mica schist		Gray mica schist & quartz	Gray mica schist			

APPENDIX - BORING LOGS/1 - 3 LOCATION MAP



APPENDIX - BORING LOGS/4

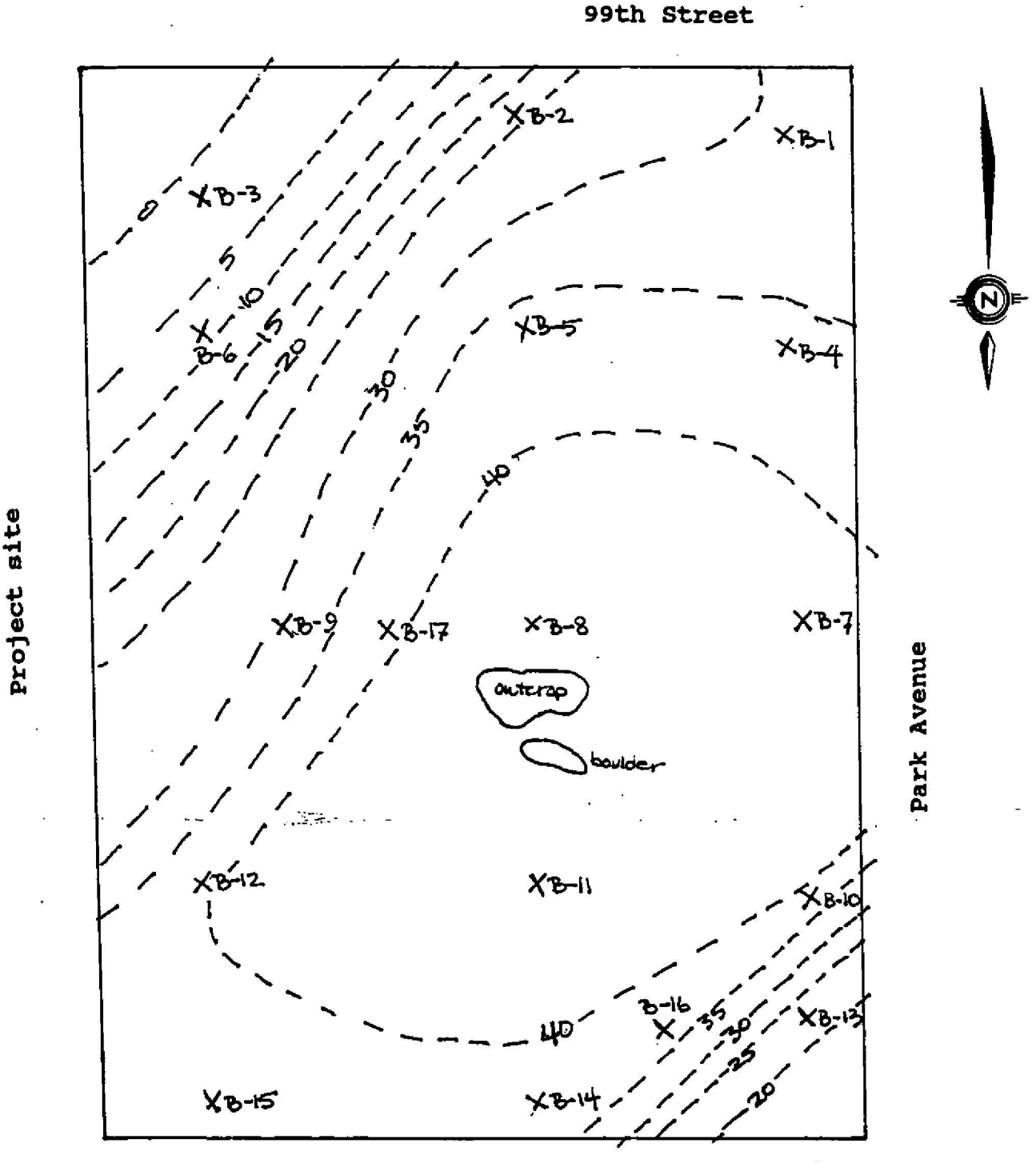
Borings conducted by LETCO (Law Engineering Testing Co.) (LETCO c1974; NB#25-1974)

Residual Soil = micaceous silt & clay, low plasticity inorganic silts & very fine sands

B1	B4	B7	B10	B13	B2	B5	B8
Fill 46.1' to 36'	Fill 46.9' to 37'	Fill 49.9' to 46.4'	Fill 52.8' to 42.8'	Fill 53.8' to ?	Fill 46.2' to 31'	Fill 50.4' to 38'	Fill 51.3' to 44'
rock	rock	rock	Resi-dual soil to 38.8'	Resi-dual soil (4' thick)	rock	rock	rock
			rock	rock			

B11	B16	B14	B3	B6	B9	B12	B15
Fill 55.3' to 45'	Fill 54.5' to 47'	Fill 55.4' to 46'	Fill 46.7' to 35'	Fill 50.7' to 35'	Fill 53.9' to 34'	Fill 55.9' to 41'	Fill 56.5' to 39'
rock	Resi-dual soil to 39'	Resi-dual soil to 43'	rock	Resi-dual soil to 16'	Resi-dual soil to 29.5'	Resi-dual soil to 36' (org layer 40.9' to 48.9')	Resi-dual soil to 36'
	rock	rock		rock	rock	rock	rock

APPENDIX - BORING LOG/4 LOCATION MAP



BORING LOCATIONS

--- CONTOUR OF RELATIVELY SOUND & CONTIGUOUS ROCK (LETCO c1974)